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[OFFICIAL NOTICE.]

Annual Meeting, American Gas Institute.

HEADQUARTERS, AMERICAN GAS INSTITUTE,
29 West 39th St., New York City,
August 17th, 1910.

The Annual Meeting of the American Gas Institute will be held at Headquarters, 29 West 39th street, New York, beginning Wednesday, October 19th.

Hotel headquarters will be at Hotel Astor, Times Square.

It is important to engage rooms early.

The Committee on Arrangements has not entirely completed its programme, but has plans for a banquet Thursday evening, at the Hotel Astor, a theater party on Wednesday evening, for members and accompanying ladies, and a steamer excursion on Friday.

Special rates are being arranged by the Trunk Line and other Railway Associations, details of which will be announced later.

The following hotels have quoted rates:

Name.	Location.	Single Room. Without Bath.	Single Room. With Bath.	Double Room. Without Bath.	Double Room. With Bath.
Breslin	Broadway cor. 29th St.	$1.50	$2.50	.....	$4.00 up.
Gilsey	" " " " "	1.00	2.00	$2.00	3.00 "
Imperial	" " 31st "	2.00	2.50	3.00	4.00 "
Martinique	" " 33d "	1.50	2.50	2.50	3.50 "
Herald Square	" " 34th "	1.50	2.00	2.50	3.00 "
Marlborough	" 36th and 37th "	1.00	1.50	2.00	2.50 "
Knickerbocker	" and 42d "	....	3.00	4.00	5.00 "
Astor	Times Square	2.50	3.50	3.50	4.50 "
"	" "	3.00	....	4.00	.... "
"	also, room with shower bath.	3.00	3.50	4.00	4.50 "
Manhattan	42d and Madison Av.	2.50	3.00	5.00	5.00 "
Belmont	" " Park "	2.50	3.50	3.50	4.50 "
Grand Union	" " " "	1.00	2.50	2.00	3.50 "
Holland	5th Av. and 30th St.	2.00	3.50	3.00	5.00 "
Waldorf-Astoria	5th Av. and 34th "	3.00	4.00	5.00	6.00 "
Savoy	5th Av. and 59th "	2.00	3.00	3.50	4.50 "
"		2.50	....	....	.... "
"	American plan	4.50	....	....	.... "
Netherlands	5th Av. and 59th St.	2.00	3.00	3.00	4.00 "
Plaza	" " " " "	2.50	4.00	....	6.00 "
Murray Hill	Park Av. and 40th "	2.00	3.00	3.00	4.00 "

It is planned to have a morning and afternoon session, Wednesday and Thursday, with lunch served in the Engineering Societies Building, between sessions, and to devote Friday to the excursion.

The Technical Committee announces that it has 16 very interesting papers to be presented, covering technical, commercial and general subjects.

Further announcement in relation to subjects of papers and details of meeting, will be made later. A. B. BEADLE, Secretary.

[OFFICIAL NOTICE.]

Eighteenth Annual Convention, Pacific Coast Gas Association.

LIBRARY OF CONGRESS, AUG 29 1910, SMITHSONIAN DEPOSIT.

PACIFIC COAST GAS ASSOCIATION,
OFFICE OF SECRETARY,
SUTTER BUILDING, SAN FRANCISCO, CAL.

To the Members Pacific Coast Gas Association: As the 18th Annual Convention of the Association, to be held in Los Angeles, Cal., September 20, 21 and 22 draws near, I take this means of once more calling your attention to the same, "Lest you forget." Our general letter advising as to programme and other arrangements will be mailed on or about September 1st, so that in the meantime it is up to you to make your arrangements accordingly to be with us.

Don't miss this meeting, as our President, Mr. W. B. Cline, of Los Angeles, is putting forth his best efforts to make this meeting the meeting of all meetings in the way of papers to be read and the entertainment of members, and it is up to the members at large to respond and show their appreciation of the same. Yours very truly,

JOHN A. BRITTON, Secretary.

[Official Notice.]

Experience Section, Pacific Coast Gas Association.

Office of the Experience Editor,
Room 610, 445 Sutter Street.
San Francisco, Cal., June 26, 1910.

To the Members of the Pacific Coast Gas Association: Someone has said that "Education is not the result of a course of study; it is the result of a course of experience." And the Editor of your Experience Department, whom you honored by that appointment at the last meeting, would like to have you share with him a bit of experience that has helped to make you successful, so that he can tell it to the Association at the Los Angeles meeting, which is so near at hand—September 20, 21 and 22. The name of the sender will be treated confidentially, if so desired. Faithfully yours,

Leon B. Jones, Editor.

BRIEFLY TOLD.

CURRENT MENTION.—

Just as we are going to press, news reached us that Mr. Thomas Turner, for many years connected with the Charleston (S. C.) Gas Light Company, died at his home in that city, about a fortnight ago. *Vale!*

Mr. J. D. Shattuck, who truly is a wideawake man at all times, is particularly alert in his management of the affairs of the Philadelphia Suburban Gas and Electric Company, the headquarters of which are in that veritable garden spot known as Chester, Pa. Working in nice harmony with him is Mr. G. W. Thomson, whose control of the new business departments of the plants of the American Gas Company—this sterling operating Company has been in the possession of the Suburban Company for some time—is of the progressive sort. In order to even things up along the line, Mr. Thomson recently visited the operating Company's plants at Kewanee and at Rockford, Ills., and when his supervising stay there is at an end, there is no doubt that his experience in the distribnting field, together with his practical way of doing things, will have put Kewanee and Rockford well in the Chester class, in so far as a progressive revival of business is concerned. Mr. Howard Mack, who has been in charge of the new business department of the Coatesville section of the Philadelphia Suburban Gas and Electric Company, has been appointed New Business Manager of the Kewanee (Ills.) Light and Power Company, and assumed charge the 11th inst. While this is a trifle far for the appointee from busy Eastern centers, it is nevertheless true that he readily adapts himself to circumstances, and it is equally certain that no ordinary circumstance is likely to down him. He entered the gas business a few years ago in Chester, Pa., and his success in his particular line is largely due to the excellent initial training of its new business men by the Philadelphia Suburban Gas and Electric Company, all of which system was originally planned by G. W. Thomson. The main Company also announces the appointment of Mr. E. F. Davis, as Assistant Manager, new business division. This gentleman, who formerly and capably represented the Geo. M. Clark Company in the Eastern States, which service in itself should mean an academic education in new business methods, is so well equipped for his nominally new field of duty that success cannot fail.

Mr. C. E. Brysen, Manager of the Hoopeston (Ills.) Gas and Electric Company, is to be congratulated over the successful completion of a series of betterments on both divisions of the Company's plants, which betterments involved an expenditure of $80,000, ¼ of which sum went to the gas section of the property. In an article descrip tive of the improved plant, recently published in a local paper, the concluding paragraph of the account read: "The local representative of the Company certainly deserves credit for the patience and tact with which he has stood between the Company and the patrons, and for finally bringing order out of chaos."

Mr. Frederick J. Mayer, representative in America of the Didier-March Company, is surely to be congratulated over the handsome book (for such it veritably is) just issued by them in connection with the affairs of that great concern in so far as these are concerned with the well-known Dessau system of bench construction. The text completely describes several well-known installations of benchwork on the Dessau vertical principle and plan, and the aforesaid text is well supplemented by a series of pictures. The scope of the text and illustrations leaves little to the imagination, the entire subject being treated in a manner which virtually enables the comprehending of the practicals treated in easy fashion, and without perplexing study. While the foreign examples of installation will, of course, be well worth close study, naturally the scheme which will attract the greatest attention and the notice of American engineers, certainly is the illustrating of the example shown in this country in the works of the Providence (R. I.) Gas Company. This plant has been in successful operation for some months, and its operators have only words of praise to give it. The installation is shown in perfectly well put sectional view, on page 34 of the book, and still more space is given to it in an illustrated appendix, giving a fine exa mple of side elevation, longitudinal section, plan on top of bunker and top tier of benches, etc. This book has be en mailed to the industry, but those who failed to receive a copy may obtain one by addressing Mr. Fred. J. Mayer, at his address, 50 Church street, N. Y.

Bids for a complete water gas plant and a high pressure system of distribution, will he opened at Belle Plaine, Ia., September 10th. There will be about 6 miles of mains. Further "information" may be obtained by addressing H. R. Mosnat, Belle Plaine, Ia.

Mr. R. M. Dixon, President of the Safety Car Heating and Lighting Company, No. 2 Rector street, New York, informs us that Mr. John J. Mallay has been appointed General Purchasing and Supply Agent, and will have charge of all depart ments heretofore under Mr. Pye. This arrangement became effective the 23d inst.

The report from the Board of Public Service Commission, First District, New York, respecting gas m eters tested during the month ended July 31, 1910, is as follows:

Meters Tested.	Number.	Per Cent. of Total.
On complaint	162	0.7
New meters	4,428	19.4
Repaired and removed	20,242	79.9
Meters Complained of.		
Fast, 2 per cent. or over	63	38.9
Slow, 2 per cent. or over	16	9.9
Between 2 per cent. fast or slow	83	....
Complaint Meters.		
Absolutely correct	15	9.3
Fast	88	54.3
Slow	58	36.4

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

Bureau of Information, The American Gas Institute,
Headquarters, Gas Office Building,
V. F. Dewey, Chairman. Detroit, Mich., Aug. 4, 1910.

Qucstion No. 63.—(a) Has there been any litigation against the erection of gasholders? If so, cite cases and the n ature of cases.

(b) Are there any statistics on explosions of gasholders?

(c) Has a gasholder ever been struck by lightning such as to seriously damage and cause explosion?

(d) Is there any authenticated compilation of the number of gasholders in use in the United States? How long have they been in use, and how many have exploded?

Answer to Question No. 63.—Submitted by the Bureau.

(a) There has been considerable litigation in connection with gasholders. City of Cleveland *vs.* Gas Light Company, No. 20; New Jersey, *e. g.*, 201. Court held that a gasholder in itself was not a nuisance. Brooklyn Union Gas Company had suit brought against it enjoining it from building a gasholder in the neighborhood of a hospital. Decision favorable to Gas Company was rendered by Supreme Court of New York and sustained by the Appellate Division of the United States Court.

(b) There is no compilation of statistics on explosions of gasholders. So far as we can learn there has been no real explosion of a gasholder. Gasholders have collapsed and afterwards taken fire.

(c) No information has been obtained.

(d) No information on this point has been obtained.

V. F. Dewey, Chairman.

Concerning Machinery Bearings.

[Prepared for the JOURNAL by "ENGINEER."]

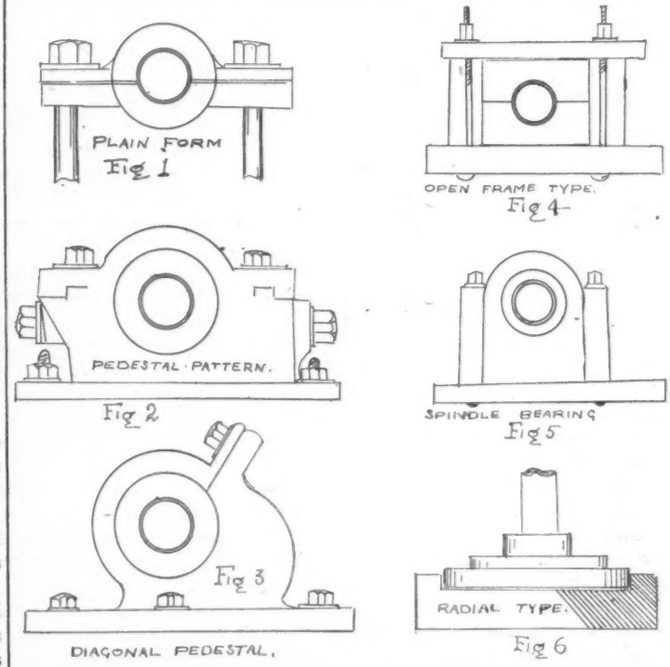
Fig. 1 is a drawing of the plain form of bearing, usually employed in machinery in which the shafting does not have to revolve at an excessive speed, and Fig. 2 portrays one of the pedestal types of bearings; Fig. 3 shows a diagonal form. Bearings used in machinery, and on the lines of shafting of a mill as well, can be divided into 3 general classes: First, the rotary forms, which include practically all cylindrical styles in which the surfaces move with uniform velocity; second, the reciprocating forms which possess flat or parallel surfaces and move on each other accordingly; third, the radial types of bearings, in which the surfaces are normal to the axis and operate with different velocities, according to the distances from the center—such, for example, as a coned bearing. In addition to these bearings, of the three general classes, there are various types of ball, roller, pivot and kindred types of modern invention and application. The common cylindrical bearings, which are, of course, used more than those of any other kind, are readily changed to be run with the small steel balls and cups, thus bringing them under the head of ball bearings.

In the construction of bearings the common materials employed include cast iron, steel, metal alloys of hard brass, bronze, mixtures of lead and antimony, glass, wood, cement and other forms.

Babbitt and gun metal are also used for bearing surfaces, and all of the large smelting establishments of the country turn out various patented and common mixtures of metals for the linings of bearings for engines, mill machinery, lines of shafting, etc. The cast bearing is popular, although numerous forms of turned bearings are in use. Some of these are turned afterwards, being made smooth and effective for the rotating motions required in either slow or fast speed. Journal boxes for wood bearings are turned out by the shops, which journals may be seen in use on heavy machinery where large parts can be employed to advantage. The common, rigid form of journal bearings, of the plain class shown in Fig. 1, is usually lined with hard metal for the sleeves, and these bearings are useful for mounting on almost any kind of a frame of iron, wood, brick or the like, since the bolts can be passed through the frame and secured with nuts on the terminals. The pedestal pattern of bearing, shown in Fig. 2, usually has planed connections with cases of brass, and made more complete than the common cast iron journal. If a heavy pedestal is required the side brasses or cheeks are set up with screws, the recesses to receive the screws being cored out so as to accomodate the same. The diagonal pedestal type of journal, exhibited in Fig. 3, is used in cases when a horizontal thrust is needed, as in some types of engine shafts. Considerable skill is required to work out the curves and angles required in this description of journal, and linings of white metal are generally used. Sometimes seats of brass are substituted with good results, according to the demands that are to be put upon the journal.

The open frame (so called) design of bearing is shown in Fig. 4, and this form of bearing is often constructed in the home shop for emergency purposes. In one case the main shafting of the engine was put out of commission through the breaking of the bushing of the journal. In order to keep the plant going the engineer and fireman manufactured one of these simple forms of open frame bearings from stock collected about the machine shop. The frame held the sleeves of the journal steadily in position, and it was then bolted securely to the engine frame, this bearing serving all purposes until a proper bearing was obtained by express from the builders of the engine.

In another plant it was necessary to adjust a box with a spindle bearing on a countershaft in the plant, or shut down a line of shafting which carried the pulleys employed in driving several important machines. The spindle bearing, shown in Fig. 5, was used as an emergency substitute. It consists of a shell, not split, as shown. Only the endwise adjustment is possible, but for quick emergency service such a bearing is suitable, and it is a good idea to have a few of this sort in different sizes in stock. A radial bearing was used in one hurry-up case for the lower end of the shaft of a centrifugal machine in which the original plate was broken. The radial type of bearing, as shown in Fig. 6, consists of a bearing in which the surfaces move at different velocities, according to the distance from the center. This form of bearing corresponds in actual operation to collars, end bearings or similar mechanical revolving forms of this order. The disk revolves on the seat shown in the cross section. It is difficult to keep this style of bearing properly lubricated, for which reason it is not used unless necessary. You will find it occasionally employed in the bottoms of wheel-pits as the step for the upright revolving shaft of the wheel.



The Use of Tar on Roads.

[Prepared by MR. A. D. WHITTAKER (Atlanta, Ga.) for the Last Meeting of the Southern Gas Association.]

Good roads have never been sufficiently numerous or conspicuous to have been classified among the wonders of the world. True it is that the Romans gained some renown for their good road achievements, but it seems like a long cry from Caius Julius Cæsar to John Loudon Macadam, who, about 1820, was hailed as the apostle of good roads. It seems strange that century after century should drag along with no particular development in road work, while engineering ability of no mean caliber was evidenced by the building of cathedrals, castles and walled cities all over Europe.

In 1820 Macadam was appointed General Surveyor of the roads around Bristol, England, and soon gained wide fame for his simple method of building roads of small broken stones. Surely the science of road building must have languished for 1,800 years if this simple expedient of Macadam's created an epoch in road engineering. Even now the possession of macadamized roads is set forth as a valuable asset of any community, and such roads are considered the standard of excellence for country districts generally.

The United States, with a great and glorious record of achievements in many fields, has still a tremendous lot of work to do on her roads. In 1904 only 7.14 per cent. of the public roads, outside of cities, was improved. Massachusetts—old, rich, with fair surface and thickly populated—has 46 per cent. of her roads improved—about 8,000 miles. The level States of Ohio and Indiana have each over 23,000 miles of improved roads, or about 35 per cent. each. Mountain-furrowed Pennsylvania has only 2.10 per cent. of her 100,000 miles of road improved, while Georgia has improved 2.85 per cent. of her 57,000 miles. In 1904 there were 2,150,000 miles of roads in the United States, or the equivalent of having the entire furface of the country gridironed with roads ¾ mile apart, or having it divided up into squares 1½ miles on a side. We certainly have made up in quantity what we lack in quality. Steam railroads were first developed about the same time that Macadam was building country roads for England. The magnificent distances in the United States gave a great impetus to railroad building and brought railroads to a high state of perfection, while country roads were neglected.

It became an easy matter to carry a ton of freight for ½ cent a mile, but what does the farmer pay to haul his products to the freight station when the roads are good, and in many cases, when roads are bad, he simply cannot haul his products at any price. A reaction, however, is setting in. Farmers are beginning to realize that it is

better to pay more for roads and less for horses and mules. The users of automobiles, backed by numbers and prestige, have taken up with renewed vigor the splendid missionary work and good roads' crusade started by the cycling organizations of 20 years ago. With this nervous, restless, speedy-spirited user of the public highway, the automobile, has come the necessity for a radical change in construction of the roads. We have been put back 100 years. Macadam's work must be done over again, and here is where it is the good fortune of the gas man to come to the rescue. Gas tar is bound to play an important part in the reconstruction of American roads.

A good macadam, or other stone-surfaced road, was, until recently, a very satisfactory, durable road for light and heavy horse traffic and cycling. Ordinary traffic indeed was used to help repair the surface for in most cases new road material was put down and wagon wheels rolled it into good condition.

The speedy automobile, even though shod with large rubber tires, was soon found to injure the road surface, and such famous roads as those around Boston, the Berkshires, the Oranges and Philadelphia, the pride of these localities, became a source of great concern, for no longer was the surface smooth, hard and even "sand-papered," as we used to call it, but worn in wide furrows and scattered with loose stones. Also, in the meantime, the dust nuisance was becoming a problem that would not down. In Massachusetts the maintenance cost of highways has trebled, due to motor travel.

It is probable that, in trying to settle the dust problem, tar was firs used on macadam roads. Oil had been used by railroads on their roadbeds where gravel-ballast was used, and by other railroads on all road crossings. The Barrett Manufacturing Company began to push its Tarvia with great success, and it did not take us long to discover that water gas tar was admirably adapted for the purpose.

My first experience with this was in Northern New Jersey, in 1906. The different municipalities in the neighborhood would send their 600-gallon street-sprinkling carts and fill up at the gas works with water gas tar, at 3 to 4 cents per gallon, and sprinkle the streets precisely as with water. A gallon of tar covered 3 square yards of road surface. No preparation of the surface was necessary except sweeping off the deeper dust and leaves. By sprinkling lightly the road could be walked on about ½ hour later without tar sticking to one's shoes. Another sprinkling next day would put the road in shape for 4 to 6 weeks, when another treatment would be necessary, after which the road would be in good condition for 10 weeks or more. In fact, the beneficial results of the tarring would last much longer, but some dust would be raised by automobiles. The surface of the road would become a grayish black, resembling asphalt and largely waterproof, drying quickly after a shower.

In Atlanta, in 1908, we tried street sprinkling with the thinner water gas tar with good results. The dust nuisance is more marked in and around Atlanta than in Northern New Jersey, as the stone used is more friable and the road surfaces are exposed to the sun and wind all the year around, while in the North the dust problem ceases to exist from early in the winter to late in the spring, due to wet, frozen roads and snow. Early in 19 9 an oil company appeared on the scene with a black road oil which they proceeded to sprinkle—or rather pour lavishly—on one of our prominent boulevards.

Their methods opened our eyes as to the liberty one may take with a public highway. They virtually flooded one side of the road at a time, sweeping the puddles of oil and soaking every inch of surface. Some oil would even run down the gutter. A mile of the road, except between the street car tracks, was thus treated, and the road was certainly dustless. In the meantime we had been experimenting and found that a half-and-half mixture of coal tar and water gas tar made a fine surface mixture. We had a sprinkling cart built, of 570 gallons capacity equipped with a slotted pipe, instead of a perforated one, as a sprinkler. The slot, about $\frac{1}{8}$ of an inch wide, was easy to keep clean, and a broad unbroken ribbon of tar would fall to the roadway.

The street car company gave us the order to tar the surface of the street mentioned before between the tracks, so we put down a liberal coating, about ¾ gallon per yard. That was in June. Since then the oil coating on each side of the track has evaporated, leaving a loose condition of the surface, that is muddy in wet weather, while the tarred portion between the rails is, 7 months later, hard like polished asphalt. This part has received the hard wear-and-tear caused by automobiles which, while on this drive, keep on the portion of the roadway occupied by the car tracks.

Several other streets in Atlanta have had this treatment of mixed coal tar and water gas tar, and it has virtually transformed them into asphalt streets. Before applying the tar, etc., the dust is swept into the gutters. Tar is applied lavishly enough to form puddles, and these are swept out, all tar running towards the gutters being swept into the roadway again. The force and equipment consist of sprinkling cart, pair of mules and driver, and four sweepers. One side of the street is done at a time. The dry dust is thrown back on the wet tar, and generally dry sand has to be carted from gutters of cross street and thrown on the surface.

The mixed tar does not penetrate like oil tar, and the inevitable layer of dry, dusty surface leaves the tar ready to stick to passing wheels and be carried off. Hence it is very necessary to put enough sand, etc., on top of the tar to prevent its sticking. It is best to block off the street for 2 days and let the tar set before allowing travel upon it. Board walks must be placed at each street corner and private auto entrances must have board runways to allow the autos to enter without running on fresh tar.

For hours after applying the tar the street looks like a hopeless mess, and careless drivers and pedestrians will suffer if they venture on the fresh tar. The next day the road will look drier, but travel on it should be suspended for 2 days. In the meantime, any overlooked puddles must be swept out and any particularly wet places sanded. Dry weather must be chosen for the work. An unexpected shower during the tarring, or next day, will produce a most discouraging appearance temporarily, but the final results will not be marred.

Under usual conditions, for a few days after travel has been resumed on the road, the surface will look cut up, and one may begin to doubt the success of the tarring, but in a few days the road will be rolled down to a hard, smooth asphalt-like surface of great durability. The dust question is solved, the road is made waterproof and the binding qualities of the tar stops deterioration from auto traffic.

The cost of sprinkling the streets with tar we found to be about ½ of a cent per gallon of tar; this covers the cost of driver, sweepers and team. We charged 3 cents per square yard for the work complete and we have lately raised the price to 5 cents per yard. We netted at this price 6 cents per gallon for the tar. The cost of applying tar to the surface of Revere Beach Parkway, Boston, is reported as 6 cents per yard.

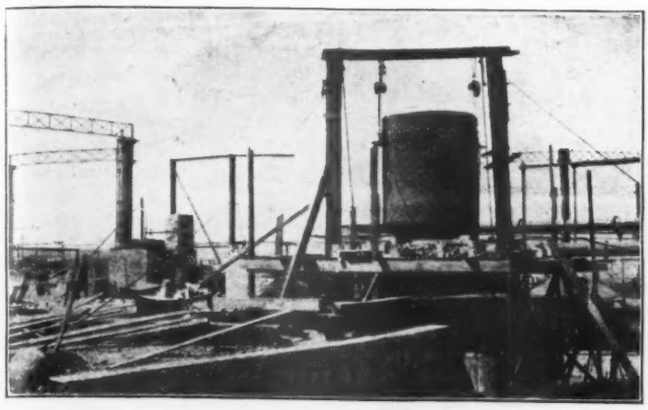
In the "Good Roads Magazine," for April, 1909, is illustrated an automobile tar-spraying tank cart, which travels at the rate of 9 miles an hour, spraying the road for a width of nearly 10 feet. The Tar Roads Syndicate, of London, advertise automobile tarring wagons, claiming over 1,000 miles of road treated with their apparatus.

From all over the country come reports of roads, boulevards, park drives, etc., treated with surface applications of tar and other materials. A glance through the advertisements in "Good Roads Magazine" will reveal all sorts of dust settlers and surface improving material, such as "Tarvia," "Pure Road Oil," "Carbo-via-Pavement," "Dustoline," "Warrenite," "Asphaltoline," and road oils by the big oil companies. Surely there is no lack of material for settling and preventing dust. Having touched on the superficial side of road tar, I shall now go deeper into the subject, and, literally, deeper into the roadbed. There is a growing tendency, and one highly advocated by the experts, to build new roads and rebuild old ones, with a proper bitumen binder; and, again, the gas fraternity is fortunate in being able to supply the material. The success of our surface treatment so pleased the Commissioner of Public Works, of Atlanta, that he decided to try our tar as a binder on a new street he was paving. This time we used a heavier tar, more nearly pure coal tar, and it was applied liberally on the top layer of stone by means of a sprinkling cart.

The tarry stone was then rolled with a 10-ton steam roller. Fine stone chips were then spread over the surface and the whole was rolled until the surface chips were damp with tar. About 2 gallons of tar per yard was used in this method and the tar penetrated 3 inches. This piece of roadway looked well when finished and was dustless, hard, durable and waterproof. A heavy flood of water rolled down this street soon after it was finished and the surface was not injured, while a cross street, paved exactly the same way, without any tar, was badly washed out. In all the work described above we used cold, untreated tar.

The laboratory report on the tar used as a binder in the street just mentioned was as follows:

Content.	Per Cent.
Specific gravity	1.2788
Free carbon	24.47 by weight.
Water	8.9 by volume.



Tar Stills in Course of Erection, Atlanta Gas Works.

DISTILLATION TEST—DRY TAR.

Light oils distilling over below 338° F.	0.4 per ct. by vol.	0.28 by wt.
Middle oils 338–518° F	27.88 "	22.07 "
Anthracine oils over 518° F	23.96 "	20.80 "
Residuum		50.90 "
Total	52.24	94.05

While we were making practical demonstrations with tar for surface applications we were turning our attention to our heavier tar which was not fit for this work. Up to the middle of 1908 we had sold many carloads of tar to roofing concerns which distilled it. They complained of the amount of free carbon in our tar and the damage it entailed on their stills, and gradually withdrew their orders. They would not take our tar at all except at 2 or 2½ cents, and claimed that a special plant would have to be installed to handle it, all of which looked bad; but we bought a small still (3 by 6 feet) and experimented with it. We got nothing out of this still but some experience. The tar market was dead as far as we were concerned. However, we decided to install a large still. I read up on the subject and got some good ideas from Lunge's work on tar and ammonia, and from articles appearing in the Gas Journals, particularly one in the AMERICAN GAS LIGHT JOURNAL, October 19, 1908. We had a still built 7 feet in diameter by 8 feet high, with convex top and bottom, provided with a 6-inch draw-off at center of the bottom and another at the side close to the bottom. The whole bottom of the still was protected by a firebrick arch, spanning the firebox, leaving a dead space between the still bottom and the arch, in no way connected with the combustion chamber. The products of the combustion are carried up and around the side of the still, about half way up, and there escape into an iron stack. If the arch is constructed of No. 1 firebrick, carefully laid, it gets red hot in operating, but gives no trouble whatever. The 6-inch draw-off pipe is run through a firebrick flue communicating with the air. After operating 3 months we have had no stoppages in this pipe and no encrusting on the bottom of the still.

The brickwork is carried to and over the top of the still. We afterwards erected another similar still alongside of the first one. The 3-inch vapor pipes from both stills unite and form a coil in an 8 by 8 tank, located overhead near the top of the stills. The tar to be used in the stills is first pumped into this tank and is warmed by the vapors to 150° or more. This helps displace any water in the tar. The water rises to the top as the tar is warmed, and is drawn off through a pipe tapped in the tank at the tar level. This warming tank also serves as a condenser and relieves the work of the water condenser, which the vapors next enter. The water condenser is a tank 5 by 6 feet, having a 2-inch coil of pipe. The condenser oils run out of this condenser directly into a pair of tanks holding 400 gallons each, the outlet pipe being swung from one tank to the other, as the distillate changes from water to oil. From these receiving tanks the creosote oil is pumped to a storage tank. A by pass is provided for the warming tank and for the condenser. Immediately back of the stills is an iron tank 4 by 10 feet which receives the hot pitch and acts as a smothering chamber for condensing the pungent vapors that arise from the hot pitch.

About 2 days before we had the stills ready to operate, Mr. Prevost Hubbard, chemist and road expert for the office of Public Roads, Department of Agriculture, arrived in Atlanta from Washington, in answer to a call from the DeKalb County Road Commissioners, to confer about some new roads to be built. They decided to lay a stone road with tar or bitumen as a binder. When he asked us if we could supply refined tar, he was rather surprised to learn that we could. We rushed final completion of the stills, and were ready with a sample batch in a few days. Other samples were furnished by tar and oil companies, and soon a stretch of road was finished, 40 feet wide, made up of one sample of binder after another, each occupying about 100 feet in length. Our sample of tar proved satisfactory, and we made a price of 5 cents per gallon at the gas works. Our stills went into active commission, and we made 600 gallons of refined tar a day for use on the road.

Our tar is stored in an old holder tank, 64 by 20 feet, and in our active relief holder. The water gas tar in the old holder had been crowded to the top by the continual additions of coal tar. Sampling at different depths showed stratification to exist, and testing these samples showed varying amounts of free carbon and water. The old stock of coal tar was found to contain 25 to 30 per cent. of free carbon. The water gas tar had only 4 per cent. The road pitch specifications permitted only 20 per cent. of free carbon.

Form 105. ATLANTA GAS LIGHT CO.

TAR STILL OPERATING, DAILY REPORT.

Still No. ..... ATLANTA, GA. ....19....
Time Charged .....Fire Started .....Fire Drawn .....
Time Run Off .....Fuel Used-Kind ..Weight .....
.....Ft. .....Ins. Coal Tar From.....
.....Ft. .....Ins. Oil Tar From .....
.....Ft. .....Ins. .....
Total Gallons Charged.....

Time.	Temp.	Depth, Oil.	Gravity of Oil.	

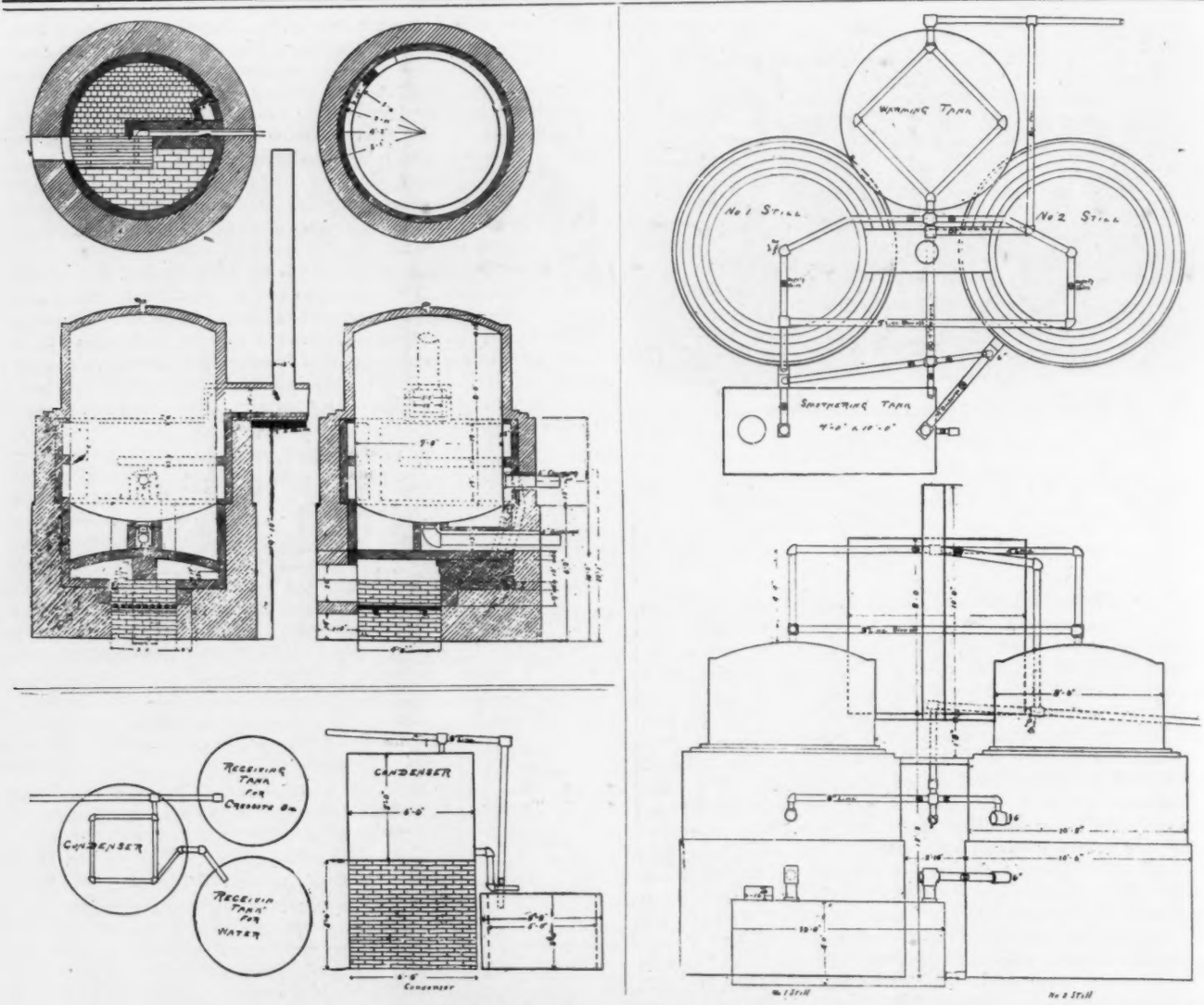
	Gallons.	Per Cent.
Water Made.		
Light Oil.		
Heavy Oil.		
Pitch.		

Day Operator.....
Night Operator.....

On starting up a cold still 1,000 gallons of the proper mixture of tar are pumped directly into the still, so many inches of coal tar and so many inches of water gas tar. The 1,000 gallons fill the still half. At this level there is placed a 1¼-inch cock. A fire of coke, or any suitable fuel, is started under the still, with water under the grate to protect the bars. As the tar warms, any free water in it will rise to the top and can be drawn off at the 1¼-inch cock mentioned above. This saves the necessity of distilling this water. On top of the still there must be a thermometer reading up to 700° or 800° F.

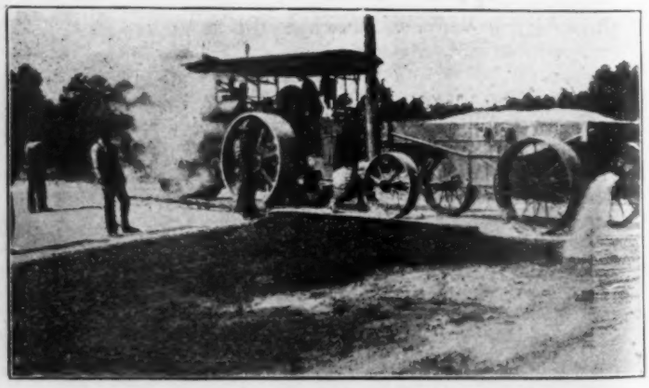
The temperature must be kept around 212° for about 3 hours before it is safe to let it go higher. Otherwise the tar will boil over. To meet this emergency, and to provide against back pressure from stoppage in the condenser coil, a safety valve must be arranged on top of the still, and the escape from the safety valve must be piped full size to some tank or the tar well. The average temperatures of the vapors taken at the top of the still are as follows:

Period.	Degrees F.
1st hour.	Warming up.
2d hour.	Warming up.
3d hour.	Warming up.
4th hour	210
5th hour	220
6th hour	240
7th hour	300
8th hour	360
9th hour	410
10th hour	455
11th hour	490
12th hour.	520



Tar Still at the Works of the Atlanta Gas Light Company.

Peachtree Road, DeKalb County, Georgia.—Tar Heating Wagon and Steam Roller Applying Hot Tar on Stone.

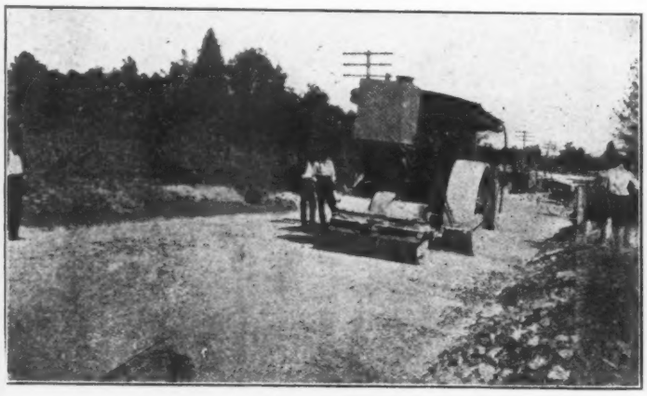


Peachtree Road, DeKalb County, Georgia.—Traction Engine and Stone Wagon Scattering Fine Stone Chips Over Freshly Tarred Surface of Stone.

No tar must be allowed to escape around the still, on account of danger from fire. An inch test cock, high up on the side of the still, piped down to a convenient level and sealed in pail of water, will afford a means of telling when the tar is in excessive ebullition. Drawing the fire promptly will prevent boiling over. It is a good precaution to have a fire hose and some sand pails close at hand. The vapor escaping from test pipes, safety valve, etc., is inflammable, and must be treated with the same precaution as gas.

The water around the condenser must not be kept too cool. In fact our practice was to fill the tank with water and then turn off the water cock. This would condense the early fractions, and would warm up and not solidify the naphthaline that comes off later. A draw-off cock must be provided on the condenser tank, to draw off the water quickly, and a steam connection must be arranged to heat up the water; or, if the tank is empty, to blow steam around the coil. This will get rid of any naphthaline quickly. The by-pass around the condenser may be opened if the stoppage is bad. Steam connections should be made with the vapor pipe near the overhead warming tank, and at the condenser, in order to use the heat and pressure of the steam inside of the vapor pipe to help clear it. Of course, in this case, a valve between the steam inlet and the still must be closed to keep steam out of still. Water will continue to come over with the oil after the temperature is well above 212°. By taking frequent samples of the distillate in a test tube or bottle, one

Applying Hot Tar on No. 2 Stone by Means of Hose.



Peachtree Road, DeKalb County, Georgia.—The Final Tarring.

can tell when to swing the pipe from the water tank to the oil tank. The oil has a greenish appearance. When cold, a large percentage of naphthaline crystallizes out. The oil must be pumped into the creosote storage tank while still warm.

We carry our final temperature in the still to 550° for road pitch and 700° for roofing pitch. When the proper temperature is reached the fire is drawn but is allowed to remain in until it is convenient to draw off into the smothering tank where it will remain hot for 6 to 8 hours. The final temperature of the still depends upon the viscosity required in the refined tar. The viscosity can be measured in several ways, one of which is described later. We use a Somers' viscosity meter, which consists of a float provided with a sort of fusible plug, plugged with a definite quantity of the pitch. This is floated in water at 120° F. The time is taken by stopwatch, from moment of placing in the water to the moment the float sinks by the plug, melting, allowing the water to enter. The specifications call for 2½ to 3 minutes.

DeKa'b county owns a complete road building plant (quarry, crusher, traction engines, steam rollers, a train of stone wagons) built by the Port Huron Engine and Thresher Company, of Port Huron, Mich., and portable tar heating tank and iron tank wagons. These tank wagons hold about 300 gallons and are sent to the gas works and loaded with the hot pitch direct from the still. The wagons hold one distillation (600 gallons) the result of boiling down 1,000 gallons of tar. The tar wagons make the 9 mile trip to the point of operations in 3 hours, and the pitch is still hot enough to run out and be transferred to the portable heating tank.

The road being improved is an ordinary dirt road. The roadway is first widened to 40 feet, then graded, drained and rolled to the proper crown. Ten-ton steam rollers are used. Broken stone of No. 1 size, 2 to 3 inches in largest dimensions, is first spread over the rolled surface of earth and clay, and No. 2 stone, 1 to 1½ inch in size, is added, bringing the total depth of stone to 7 inches. This is then rolled just enough to form a level surface without crowding the stone too tightly together.

The portable tar heating tank holds 600 gallons, is mounted on wheels and equipped with a firebox. The tar is heated to 300°. This outfit is pulled into place by a traction engine, and coupled to it is a wagon containing fine stone chips. The hot pitch is poured over the surface of the stone by means of a broad, flat nozzle on the end of a hose. It requires about 35 to 40 minutes to cover 400 square yards, using 1½ gallons per yard. As fast as the stone is tarred, fine stone chips are scattered over the surface, and as soon as the tank of tar has been used up, and the surface well covered with fine stone, a 10-ton steam roller travels back and forth over the section. The tar is forced down between the stones to a depth of 3 inches, binding them together. This is much easier and cheaper than mixing the tar and stone together first, and is apparently just as effective. After the rolling is finished, the loose stone chips are swept off the surface and a light coat of tar is applied (½ gallon per yard) and more fine stone chips are scattered over this and rolled again. The result is a fine, smooth, hard surface, resembling bitulithic pavement, dustless, waterproof, and of great durability. Tar should not be used in road construction on days when the air temperature is below 50° F. at 7 A.M., and in no case when the air temperature is below 60°.

The same road has been rebuilt the same way for several miles out of Atlanta, in Fulton county, except that no tar has been used as a binder. The wear-and-tear is noticeable already, and the dust is a terrible nuisance. The same amount of rolling stone, etc., is as necessary on a plain macadamized road as a tarred macadam road. The only extra expense is the cost of the tar and the trifling cost of heating and applying it. Deducted from this should be the cost of water and binder necessary in putting down the plain road.

The tarred macadam road in question is costing about 15 cents per yard more to build than a plain road It is by far the cheapest automobile-proof road that can be built, and in addition, presents features of smoothness and cleanliness that were once supposed to be attributes of luxurious city asphalt streets only. The road is being built under the immediate supervision of a government road engineer, and our tar is subject to the closest scrutiny. A sample is taken from every batch and sent to Washington for analysis.

It ought to be a significant fact that a gas company whose tar has been rejected, to a certain extent, by tar distilling concerns, is able to furnish refined tar conforming to the strict specification of the government. There is a large amount of activity in road tar work all over the country, and this means great things for gas men and to the public.

In December I sent out letters to all of the gas companies in the territory of this Association, asking for information about tar. I received 36 replies, representing an annual production of 3,954,000 gallons of tar. Only 26,000 gallons, outside of Atlanta, were used on the roads; 1,760,000 gallons were sold at an average price of 3 cents. No price was given on 1,467,000 gallons, and only 727,000 gallons were reported as selling at over 3 cents. It is probable that the average price of tar in the South to-day is not over 3½ cents per gallon.

We find it possible to take 1,000 gallons of tar and make 600 gallons of pitch, worth $30 to $35, and 300 gallons of creosote oil, worth $30. After deducting $5 operating expenses, it leaves 5½ to 6 cents per gallon for the original 1,000 gallons.

When the tarred macadam movement gets well underway the price of tar will rise, for there will not be enough to go around. Every mile of road 20 feet wide will require 23,460 gallons of tar. It is evident, therefore, that a gas works in any community would not be able to supply all the tar needed for its roads for a good many years. There are room and need for all the coke oven tar, oil refinery tar and asphalt that can be secured.

In 1908 the gas works of the United States produced 58,540,000 gallons of tar and the coke oven plants produced 42,720,000 gallons, a total of 101,260,000 gallons, at an average price of 2½ cents. All of this tar, if used for road building, would make only 4,300 miles of road 20 feet wide. Not a very startling yearly total, when we think of those 2,000,000 miles of unimproved roads.

The Board of Public Roads, of Rhode Island, reports the cost of making a tar macadam road, over the ordinary form, 12 cents per square yard.

In Massachusetts a macadam road costs 10 cents per inch of depth of stone per yard. If the stone is 7 inches deep the cost will be 70 cents. The tar binder, therefore, adds only 18 to 20 per cent. to the cost of the road and saves enormously on repairs.

Interesting experiments were conducted by the Office of Public Roads, Newton, Mass., in 1908, on a street that had been macadamized 20 years before. The entire surface was spiked up, crowned and rolled with a 20-ton roller. A 2½-inch course of 2 by 2½-inch stone was spread and rolled. Over this a course of bitumen-covered stone was placed and rolled with different sorts of asphaltic and tar binders, and stone screenings or sand, with or without different binders, were

used as fillers or surface coating. In all, 11 sections of road, averaging over 100 feet in length, were laid.

A section containing .81 gallon refined water gas tar compared most favorably with the other sections. In another section sand and refined coal tar, .18 gallon per square yard, were used as a surface application over the bitumen-covered stone, and the result was highly praised. The government also built nearly a mile of road between Birmingham and Ensley, Ala., 1908, using tar and slag. About 1.1 gallons of tar were used per square yard. We can find an outlet for our tar in making paths and driveways. Mr. H. F. Kincaid, Superintendent and Secretary of the Citizens Gas Light Company, Jackson, Tenn., very kindly reported the following method used for making sidewalks:

"In all about 16,000 yards of roads and walks have been covered. About 1 gallon of tar is used per square yard.

"First, the walk or driveway should be well graded and drained, with ditches on one or both sides, and the earth, which is here a yellow clay, solidly compacted. On this spread about 3 inches of clean cinders well tamped. On top of this spread out 2 inches of cementing or clean gravel, not over ¾ inch in size. In our case we use what is known as a fine Novaculite. This gravel should be well tamped and rolled and crowned enough to shed water. In fact, the preparation up to this point is practically that of a first class roadbed, excepting as to thickness and size of gravel. It is well to do this preparatory work a couple of months before tarring. Between the time of preparation and tarring one or two good rains on the gravel are advantageous, as they wash out the cement material from the top of the gravel.

"For heating the tar, an old 20-horse power boiler of the semi-portable type is used, with half of the flues removed, and the holes closed up with cast iron plugs. This boiler will hold 350 gallons, and about 1 bushel of coal will heat tar to required temperature. The boiler is mounted on an iron wagon body, with wide tired-wheels. Two horses move this rig along as required. A 24-foot length of rubber hose is connected to bottom of boiler for drawing out the tar. Preferably for tarring, a hot day is selected, when the gravel has been well dried. A tank full of hot tar is moved along the roadway, parallel with walk, and the tar is spread as evenly as possible over the surface of the walk by means of the 1¼-inch hose. The wagon is followed by 2 or 3 men with old brooms, who sweep the tar into the crevices, prevent the formation of pools, etc.

"About 1 hour after the tar wagon, a wagon comes along loaded with thoroughly dry sand, which is scattered over the walk to an even thickness and about ¾ inch. This practically completes the walk, although it is just as well not to have it walked over for 2 or 3 days. A light rolling perhaps would be advantageous after a day or so, but this is not usually done. The sand sinks into the spaces between the gravel and absorbs part of the tar, and the balance of it is washed off by rain later on.

"The result is a walk, which, if carefully put down, is almost as good as asphalt, and the cost should not run over 30 to 40 cents per square yard. To get satisfactory results, the preliminaries must be taken care of, otherwise frost will destroy the walk very quickly, and the walk will never acquire a smooth, hard top surface. We have had trouble with the walks in various locations, just because the draining and cindering were not properly attended to. The result is, when the frost comes out of the ground these walks cut up very badly. In places where we have to cut through walks for pipe, or something of that kind, we found that the tar had penetrated to something like 1½ inches, cementing the top solidly.

"The volatile parts of the tar on top quickly evaporate, so that very little trouble is experienced with picking up tar on shoes, etc. The coating of sand prevents this in the earlier stages, and by the time the loose sand has disappeared the tar is too solid to be picked up."

Mr. S. E. DeFrese, Superintendent of the Chattanooga Gas Company, has also favored us with the following:

Tar Roads.

"The road selected for this experiment was one which had been in use about 3 weeks and was built of Georgia chert, one block 32 by 350 feet between Gas street and Baldwin and Eleventh street being used.

"July 21st, 1909, we started in at 7 A.M. with 4 men and a foreman, to sweep dust and loose material off the road, using rattan push brooms. Care was taken to leave the road free of all dust or very fine material. This being finished, a composition consisting of 85 per cent. coal tar and 15 per cent. Pintsch tar, heated 150° F. was applied from a small tank wagon holding 200 gallons, with 1¼-inch rubber hose.

"Ordinary house brooms were used to distribute the tar which was put on as heavy as consistent, the object being to allow the chert to 'soak up' as much tar as possible and not to allow any 'puddles' to remain. Tar applied this way was allowed to stand 2 hours, when concrete sand, containing about ¼ small gravels, was sprinkled over the road in sufficient quantity to prevent tar from 'picking up' on the roller. As the rolling continued, spots of tar appeared on the surface and a very fine dry sand was sprinkled over the whole surface and rolled. The road appeared to harden rapidly and was very satisfactory in this respect.

"At present (4 days after starting) the tar has penetrated on an average of ¾ inch. Since finishing, a heavy rain has fallen, washing off part of the fine sand last applied, but otherwise it did not affect the work. The street is still closed, the object being to allow the tar to fully penetrate and harden. We expect to open the street for traffic Monday, July 26, 1909.

"In conclusion will say the formula used in this work was the one which appeared in the American Gas Light Journal, issue May 24, 1909. Respectfully, S. E. DeFrese, Superintendent.

Expense of First Day's Work—July 21, 1909.

Laborers and foreman, including use of works team at 35 cents an hour		$10.18	
10-ton roller, use ½ day		5.50	
		$15.68	
Material Used.			
4 brooms at 60 cents	$2 40		
3 brooms at 38 cents	1.14		
203 gallons tar at 5 cents	10.15		
3 yards sand at $1.25	3.75	17.44	
Total labor and material, July 21, 1909			$33.12

Expense of Second Day's Work—July 22, 1909.

Laborers and foreman, including use of works team at 35 cents an hour		$11.90	
10-ton roller, used 11 hours		12.10	
		$24.00	
Material Used.			
506 gallons tar at 4 cents	$25.30		
7 yards sand at $1.25	8.75	34.05	
Total labor and material, July 22, 1909			58.05
Total cost			$91.17

Total square yards treated.....1,244.4
Cost per square yard.....$0.0813 complete.
Tar used per square yard.....0.585 gallon.

There are other uses for refined tar in street work that we must not overlook. Pitch is needed for pouring into the joints of wooden block pavements, Belgian blocks and brick pavements. Pitch is far superior to cement for brick pavements, as it is elastic and provides for the expansion and contraction of these pavements. Cement is inelastic and brittle, being responsible for the cracking and warping and so-called explosions of brick pavements. It is usual in a paper of this kind to give a list of the literature bearing upon the subject. In this case, however, new literature is appearing so fast, and new experiments are being made so frequently, that what is new to-day is old to-morrow. The reports of proceedings of gas associations and engineering societies, the country over, are full of articles on road work. The automobile publications and magazines interested in good roads publish excellent dissertations. Probably the most comprehensive reports are published by the Office of Public Roads, Department of Agriculture, at Washington. They will send a list of their publications on request.

Gentlemen, good roads are bound to come. The planter can no longer afford to load one bale of cotton behind a pair of mules, because that is all they can haul over a poor road. If he has a tarred macadam road, he loads to the limit of strength of his wagon and he knows his mules can pull it. It is now up to us gas men as to what part we play in the rebuilding of America's highways.

Appendix.

The Office of Public Roads furnished the following methods of examination of road tars:

Specific Gravity.—This method is described in detail in the "Journal of Industrial and Engineering Chemistry," Volume I., No. 7 in

an article entitled "A Useful Form of Pyrometer for Determining the Specific Gravity of Semi-Solid Bitumens."

Melting Point of Tar Pitches.—The melted pitch is first poured into a ½-inch cubical mold and allowed to cool. The ½ cube of pitch is then fastened upon the lower arm of No. 12 B and S wire, bent at right angles and suspended besides a thermometer in a covered glass beaker of 250 cc. capacity, which is then placed in a water bath. The wire should be passed through the center of two opposite faces of the cube which is suspended 1-inch above the bottom of the beaker. The liquid in the outer vessel is then heated in such a manner that the thermometer registers an increase of 5° C. per minute. The temperature at which the cube touches the bottom of the beaker is taken at the melting point.

Free Carbon.—About 2 grams of the material are weighed into a 150 cc. Erlenmeyer flask, the tare of which has been previously ascertained and treated with 100 cc. of carbon bisulphide. The flask is then loosely corked and shaken from time to time until practically all large particles have been broken up, when it is set aside over night. At the end of this time the contents of the flask are decanted off upon a weighed Gooch crucible, fiitted with a long fiber amphibole filter. The residue remaining in the flask is then washed with 50 cc. carbon bisulphide, allowed to settle, and decanted as before, the insoluble matter being finally brought upon the filter and washed with 100 cc. carbon bisulphide, or until the washings are practically colorless. The filter and contents are then dried at 125° C., cooled and weighed. Should any residue remain in the flask, it is also dried and weighed and this weight added to that of the residue in the crucible. The per cent. of insoluble residue determined as above, minus that of any ash which may be found by ignition, is reported as free carbon. Benzol may be employed as a solvent, but carbon bisulphide is usually to be preferred.

Distillation.—For this test a tabulated glass retort of 750 cc. capacity is employed. From the specific gravity of the tar, taken at 25° C., the weight of 250° C. is calculated and this amount poured into the tarred retort. A cork stopper carrying a thermometer is then inserted in the tablature so that the bulb is on a level with the mouth of the retort.

The tar should be heated gradually by means of a Bunsen burner, and the first fraction to 110° C. caught in a graduated glass cylinder. A cold, wet towel, wrapped about the stem of the retort, serves to condense the distillate. If the tar is a crude one containing much water, great care must be taken to prevent it from boiling over. After the first fraction is collected, however, distillation proceeds without further trouble. At this point the receiver is changed for another graduated glass cylinder and an asbestos or tin cover is placed over the retort for the purpose of obtaining a uniform temperature. The flame of the burner should be so regulated that about 2 drops of distillate per second are collected. At 170° C. the receiver is again changed and a third fraction to 270° C. collected. Distillation is then stopped and any material which may have solidified in the stem of the retort is liquefied by the application of heat and caught in the last receiver.

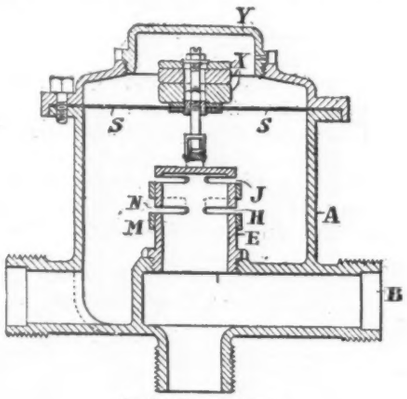
If water was present in the tar it will be noticed that the first fraction separates into two layers, the lower of ammoniacal liquor or water and the upper of oil. All of the fractions are cooled off to 25° C., their volume percentage calculated, and that of the pitch residue determined by difference. The per cent. of pitch and the various distillates upon a weight basis should also be determined and note made of the approximate volumes of solids which precipitate from the distillates upon cooling to 25° C. The results obtained from this distillation are reported as follows, to ½ of 1 per cent.:

1. Water or ammoniacal liquor	per cent. by vol.	per cent. by wt.
2. First light oils to 110° C.	"	"
3. Second light oils to 170° C.	"	"
4. Heavy or dead oils 170° C.	"	"
5. Pitch residue by difference	"	"

North's Patent Gas Governor.[1]

British Letters Patent (No. 15,769) were issued July 6th, 1909, to Mr. R. B. North, of Soho Square, Westminster district, England, for an improved form of gas governor. It is of the type comprising a casing with an inlet and outlet for the gas and a flexible diaphragm mounted in the casing and connected with a valve adapted to close or reduce the aperture for the passage of the gas to the interior of the casing as the pressure of the supply increases. In such apparatus it has been suggested to form the valve as a cylindrical slide-valve having its upper end closed and formed with ports the length of which was parallel to the axis of the cylinder. This valve was adapted to slide on the interior of a similarly ported cylindrical extension of the casing which formed the inlet to the governor for the gas pressure. According to the present invention, the valve is constructed in the form of a ring having one or more series of slots or ports which are narrow in the direction of the axis of the ring and which extend for some distance around the periphery of the ring. The ports work in conjunction with a similarly slotted cylindrical portion in the casing. The ring valve has upwardly extending lugs, whereby the valve may be readily connected, through the medium of a rod and bridge piece, to the diaphragm by means of which the valve is operated.

In the central vertical section shown of a gas governor constructed



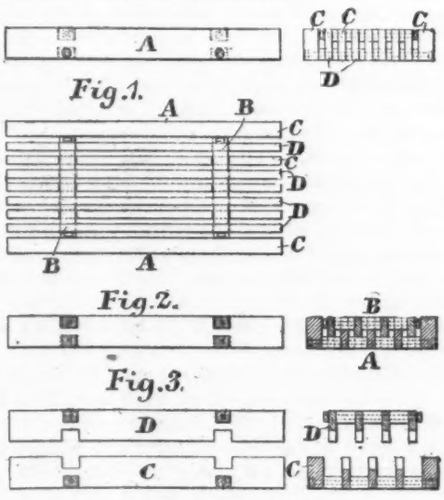
North's Gas Governor.

according to this invention, the pressure of the gas admitted to the casing *A* through the inlet *B* passes through the slots *H*, *J* and *N*, and raises the loaded diaphragm *S*, which lifts the ring valve *M* and moves the imperforate portions of it over the slots *H*. *J*; so that the greater the pressure beneath the diaphragm the more the latter is distended, and the less will be the opening for the passage of gas through the governor. Similarly, the lower the pressure the more the diaphragm is collapsed, and the greater the opening for the passage of gas.

It will thus be seen that, by removing the plug *T* from the cover, the weights *X* are readily accessible. By unbolting the cover, the diaphragm *S* and valve *M* may be removed to uncover the fixed cylindrical portion *E*, which can then be adjusted or unscrewed and removed as desired. The cylindrical portion, like the plug in the cover, may be formed with notches in its flange, in order that a key may be engaged with it to unscrew or screw up the part *E*.

The Chandler Grids for Purifier Boxes.[1]

On August 6, 1909, British Letters Patent (No. 18,656) were issued to Messrs. S. and J. Chandler, of Brixton, for a purifying box grid, the latter being of the usual description, save it is composed of upper and lower sections or members, which fit loosely one into the other and form a "compound grid." When it is necessary to clear the choked spaces between the bars, the upper member is removed, so that the spaces of both the lower and upper section are of a width which allows of their being easily cleaned.



Chand'er's Purifier Grids.

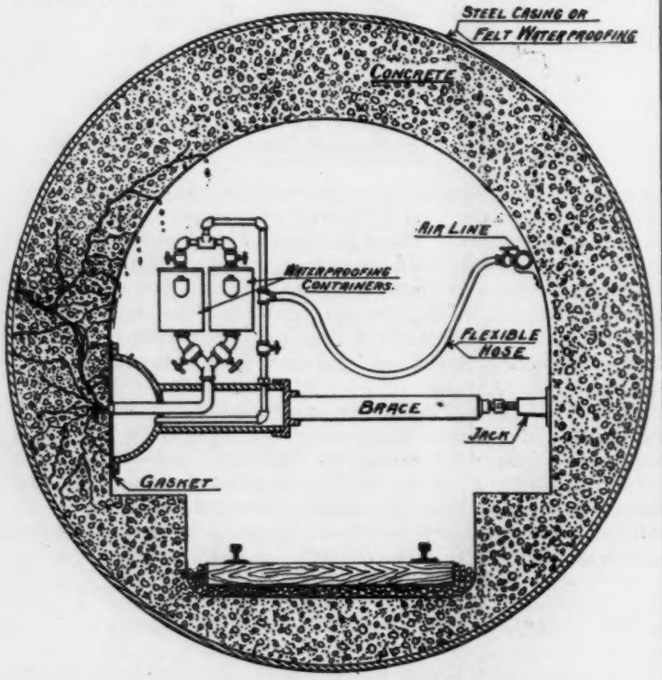
1. For both these descriptions we are indebted to the "Journal of Gas Lighting."

Fig. 1 is a side view, end view, and plan of the grid; Fig. 2 has longitudinal and cross sections; and Fig. 3 gives views of the two parts of the grid separated.

The member *A* is composed of a series of bars, *C*, united by cross-bars or distance pieces; while the member *B* is provided with a series of bars *D*, also united by cross-pieces. Bolts are passed through the cross-pieces and bars for holding the respective sets together. The bars *C* are arranged at such distances apart that the bars *D* fit between them; the two sets of bars together making up the entire surface of the grid. The bars may be notched so as to receive cross-bars; but this is not necessary, as one set of bars may rest on the cross-bars of the other set.

The Moore Waterproofing System of Masonry.

Time seems to have proven the claims made by Mr. R. E. Moore, inventor of the Moore Patent Waterproofing System, which has been tried in many instances for the waterproofing of tunnels, of cement and concrete, the covering of interior of masonry and the like, and not found wanting. The illustration shows one of the machines in



position in a tunnel, forcing the waterproofing compound into a porous concrete well. The waterproofing liquid forces back and displaces the water coming in from the outside, filling up all crevices and openings in the concrete, cementing the whole mass together and providing a durable filling, which unites with any kind of masonry and hardens under water in an elastic, clinging mass, greatly increasing the strength of the structure to which it is applied. The machine uses compressed air to force the waterproofing materials into the porous cement or concrete. It may be applied at any point or all points of the structure treated and prevents disintegration of walls where electrical apparatus may be located. It also provides an excellent insulation which is also practically fireproof. Acids and lime or other alkalies have no deleterious effect upon it.

Grouting, formerly largely employed, only checked the entrance of water at the immediate place blown and did not penetrate the crevices, for it permitted the formation of an air-cushion, which, when allowed to remain for some time, allowed the escape of the air and subsequent re-entrance of the water. Under the Moore system and process the formation of an air-cushion is not possible. It has been passed upon by the skilled engineers and chemists of the Pennsylvania Railroad tunnels and the Hudson river tunnels (McAdoo system), where it has been used with perfect success.

There are no decomposable ingredients used in the waterproofing materials, which are manufactured by the Moore Mica Paint Company, and consist of fused mica blended to a proper consistency with other durable mineral ingredients, all of which cling firmly to any cement or masonry to which they may be applied, externally or internally.

Public Policy.

[Prepared by Mr. H. M. Moore, for the Southern Gas Association.]

The complaint most frequently coming from corporate interests at this time is the unfairness of the public to all classes of corporations, especially the public service corporations. While some of this complaining has a just foundation, much of it is due to the owners and managers of the corporations themselves. As all corporations are the creatures of the Nation or State, they are necessarily subject to the power by which they are created, consequently subject to such regulative legislation as the national congress or various legislatures may deem it necessary to place upon the statute books. While it is true that at times we are forced to deal with demagogical officials whose sole desire is to exploit all classes of corporations for the single purpose of making it appear they are the true and only friends of the people, the facts remains that most of the injurious legislation now on the statute books of this country is there as the result of the lack of knowledge possessed by legislators as a whole regarding these corporations, and the further fact that said corporations will not aid the lawmakers in passing wholesome regulative laws fair alike to the public and the corporations.

Since it has been my privilege to manage a local utility corporation, I have been located for 7½ years in the Capitol City of Texas, which State has for some years borne the reputation of being the most radical in its corporation legislation. While it is true that we have laws that are to-day retarding the advancement of material interests of the State, a great part of this legislation could have had much of the sting drawn out of it had those most vitally interested joined with the lawmaking bodies in securing the passage of laws that were regulative only. But, no; it has been until very lately the policy of the corporations as a whole to fight all legislation affecting their interests to the last ditch, creating in the minds of the lawmaking body the impression that something very detrimental to the public was concealed in the books of the corporations that they did not dare let become public, and that they were all leagued together to defeat wholesome legislation.

The average legislator is not conversant with the management of a corporation. He finds one located in his district that is being complained of by the patrons. They appeal to him for redress and he draws up a bill which he thinks will remedy the evil complained of, and when the legislature assembles it is introduced. Radical? Yes. What does the average corporation do? It starts in to defeat the bill. Does it ever try to find out the cause for the introduction of the bill by consulting with the author, and, where the complaint is a just one, try to help him remedy it by assisting him, with its knowledge, to work out a bill that will not injure any corporation while at the same time it will remedy the evil? I am glad to say there are some who are doing this, and by their efforts they are securing fairer treatment at the hands even of Texas than by the old method.

Corporations frequently complain that they are not treated fairly in the matter of taxation, and there is much truth in the complaint; but are they not as much at fault in this as in the matter of legislation? How many of them will show to the proper taxing body the true amount of their gross receipts, net receipts, amount of dividends, etc.? I fear there are few of them who will do this, but simply fall back on glittering generalities and claim they are being ruined by high taxation. I have lately had a test of the efficacy of being absolutely frank in this matter. Our City Board of Equalization was raising the values of almost every class of property, some of it more than double the value rendered by the owner. When my turn came I was prepared with a statement of our gross receipts for the previous year and our net receipts. I showed this Board the amount of taxes we had paid for that year, what per cent. the amount of taxes was of the gross receipts and what per cent. the net earnings was of the rendered value. When I got through I simply asked them if they did not think we were paying taxes enough, and received the unanimous reply of the Board that they thought we were, as a whole, but that our real estate was worth $1,000 more than it had been rendered. As this was about $16,000 less than it had been proposed to raise us I felt I was being treated fairly, and agreed to the $1,000 raise.

During the last session of our legislature a certain State Senator proposed to me the amendment of a law passed 4 years before, which made 10 per cent. the legal maximum rate that gas, water and electric light companies should be permitted to earn. All of you know that it has been considered against public policy to fix such a rate; that the Supreme Court of the United States has studiously avoided rendering a decision that would fix a general per cent. This law was a sort

of compromise. Several attempts had been made to rid the statutes of the 10 per cent. provisiou. The Senator in question proposed that we get together and frame a new law that would protect the companies and at the same time eliminate this fixed rate. When I proposed to the chairman of our committee that we do this, this chairman stated that he preferred no legislation and declined to take any action that would end the trouble, and some legislator will be bringing it up each session until it is amended, when we may get a radical rate regulation bill in its place, instead of a conservative one.

One of the most potent factors in causing a better feeling towards corporations is publicity. The public and the lawmakers are perfectly willing that we should receive a fair return, but they have grown to believe that we are making enormous profits and have a veritable gold mine, but this opinion is the result of the secrecy in which all the affairs of corporations have heretofore been shrouded, and the evident dislike of corporations to allow even their creators to know what they are doing.

In dealing with your city fathers it will pay you to be fair. I find that the care of the streets is about the heaviest expense a city has, and we should try to so conduct our street work as to do the least possible damage, and then cheerfully correct any faults in our work so long as these faults come to hand. This is right along with publicity, for those who live along the street through which you have dug your trenches are a part of the public whose friendship you wish to cultivate, whether they are your patrons or not. I once started to tear up a street that had been graded and graveled only a short time before. The residents began to complain at once. I assured them I would see that the street was put back in first-class condition. When we were done several of the kickers told me it was the best job they had ever seen in replacing a street, and I have not had a complaint from them from that day to this.

It has been stated that there are only two classes of corporations that need fear publicity and regulation: First, the over-capitalized class; second, the class that does not keep pace with the growth of the city in which it is domiciled. The first cannot make a good showing, and the latter does not care to, but is content to stand still. Another class not mentioned is the corporation that never reduces its rates until forced to. I have in mind just such a corporation, that held its rates up until it had the highest rate of any other city of its size that I know of, and only two companies in very small towns exceeded its rate in the State where it was located. But its franchise was soon to run out; it did not stand well. So, at one fell swoop, it proposed to reduce its rates to the lowest in that State: but it is now in serious trouble about its franchise.

While in attendance upon the meeting of the Gas Institute in October, one of its most prominent members stated to me that he did not believe in reducing rates until it had to be done. I was surprised, for he is progressive in most things, and when I told him voluntary reduction had been an advantage to us he seemed surprised. Voluntary reduction of a rate is one of the surest ways of gaining the goodwill of the public. It convinces them that you are willing to share with them the benefits of your prosperity and the cheapened cost of manu facture resulting from increased consumption, while you are prac tically sure of still further increase in your output. How do corporations expect officials or the public to believe that they are dealing honestly with them when, as in the case of the Wells Fargo Express Company, they plead poverty and dire destruction in case their rates are reduced, and then, within a few weeks, a 300 per cent. dividend is declared on every share of stock? Does an action of this character benefit corporations in general? It strikes me it injures those that are trying to deal honestly with the public and should be condemned.

In all public service corporations there should be, where the size of the business would justify it, a trouble department, in charge of a cool and competent employee, where all complaints should receive courteous attention. We know a chronic kicker can never be satisfied, but such individuals are the exception and not the rule. In the case of the chronic kicker it is difficult to lay down any rule by which he or she is to be dealt with. I have found that generally this class of kickers is best handled by some straight-from the shoulder talk. I have two or three consumers, not very satisfactory ones, who were ideal specimens of the chronic kicker, until I assumed the position of the kicker and advised them quite plainly that they had better quit using our product, as we had done everything possible to satisfy them except to furnish them with a man to stand by their stove and manage its use, and had failed. One of these consumers had kept kicking for years, but now I never have a complaint from that particular consumer. Understand, I do not claim that I have succeeded in making every consumer my personal friend. I know I have not, but I do believe that the company has a great majority of its consumers who are friendly to it if not to its manager.

If a corporation is not doing anything that the citizens have a right to object to, it has nothing to fear in letting them know what it is doing. When the tax assessor comes around offer to show him your books, if he desires to look at them. He cannot, in the short time he has to devote to you, store his head with sufficient knowledge to hurt you—should he have such a desire; but he can satisfy himself that you are acting squarely with him, and when he finds this is the case he will not want to look at your books. I have tried this and know whereof I speak. No honest corporation has anything to fear from publicity. If its actions are all lawful, and it is giving a fair return for every dollar it is receiving, there is not the slightest danger of a majority of the people attacking it, and just so long as you have a majority of the people with you the minority is helpless. The knowledge possessed by the majority that you are square will be your strength by which the minority can be prevented from working you an injury.

I do not know that I have given you much that is new on publicity, but I have said enough to start a discussion that may bring out something new from some other member. I firmly believe that most corporations of the class we represent are trying to deal honestly with the public. Some few I am satisfied are not, and it is the latter class that causes all the trouble.

High Pressure versus Low Pressure Gas Distribution.

[Prepared by Mr. H. W. Frund, for the Southern Gas Association.]

Not so many years ago in the electric fraternity there were two factions, the low pressure dogmatic advocates and the high pressure boosters. Able minds were on both sides of the question, and invested interests in low pressure work including the Edison system of distribution, for a considerable length of time were in the lead. Not until about 1895 was it conclusively shown that the high pressure electric transmission had come to stay and the advocates of the Edison system began to change tact. Space is too brief to go into the revolutionary advancements made in the electric field to high pressure, and are not to be wondered at considering the infancy of the electric industry. Not so with the technical and mechanical progress in the gas industry. In an old and established industry like ours it could hardly be expected that advancements could be made on giant strides as in the electrical field. However, high pressure gas lighting under recent developments constitutes probably one of the most interesting and important steps in the progress of our industry, and has come to stay. As in former years in the electrical field the low pressure advocates fought strenuously against any change, so to day with the low pressure gas adherents, some of whom think the time has not yet come when high pressure supply to low pressure distribution should be seriously discussed.

High pressure gas distribution is pointing the way in which gas is destined to cope with electricity for its share of the illuminating business. Detroit, Boston, Chicago, St. Louis, Milwaukee, Trenton and other large cities are experimenting with high pressure lighting with encouraging results. In Europe greater progress is being made than in the States and, therefore, it is well that this question be brought up in the Association, the end in view being a discussion of experiences had among the few operating high pressure gas distribution, and also to and for the benefit of those wavering on the question or contemplating putting in high pressure plants.

It is not intended in this paper to set forth minutely the experience had with high pressure, as it would be too long. The object is rather to base a line for discussion of experiences had among the members of this Association.

The proposition in question is made up of a coal and water gas plant with low pressure distribution through large atmospheric pressure mains, and high pressure through small steel mains. The low pressure system was first installed to serve customers residing in the city wherein the gas plant was located. The high pressure system was afterwards installed to supply gas to an adjoining town of 3,500 population, 3 miles distant from the gas works. Such good results were obtained with the high pressure distribution that a portion of the city having the large low pressure mains is now being supplied by high pressure gas, independent however, and not tapped into the low pressure mains, as no boosting of pressure or supply in low pressure mains is necessary or required.

The plant consists of two compressing engines, one held in reserve,

one compression tank with necessary governors, regulators, etc., compressors taking gas from a large holder through a gas main line 400 feet distant. At the gasholder the initial pressure is 35 tenths. The gas is first compressed into a small tank at 45 pounds pressure, then released and discharged into 2-inch mains, where the pressure is automatically maintained, day and night, without a storage tank, at 5.5 pounds pressure. Individual regulators are installed on each service, where the pressure is again reduced to 35 tenths.

From the point where the gas main leaves the works to the first right angle turn in a public highway, distant 350 feet, the high pressure gas main is 7 feet lower than the compressor, and is the only point on the entire line of all the mains where there is a drip from which we occasionally, more particularly during the 4 winter months, drain a discolored water deposit. From this drip the main inclines until a point, 800 feet distant, the mains are 20 feet higher than the main at the drip.

The pressure upon the gas, no doubt not being sufficient to carry the water over the hill, undoubtedly is one of the reasons no trouble is experienced with complaints in the districts supplied by high pressure. Since the installation of the plant no liquid or naphthaline troubles or other complaints have been experienced, while more or less naphthaline complaints come in from the low pressure mains distributing gas from the same holder providing for the high pressure mains. On every occasion that presents itself, high pressure mains mains and services are examined, and without exception all are found to be perfectly dry, and the only trouble thus far had is in some of the services choking up at the corporation cock with a rust formation caused by too small (¼ inch) opening. Since cocks with ½-inch openings have been adopted this trouble has entirely disappeared. Occasionally we get a little distillate in the compression tank, which is then drawn off. Drips alone the entire high pressure line have been opened many times, and never has there been found anything in a drip on the main, in or between either of the two towns, except one near the works at the foot of a hill.

The temperature at the compressors when working at capacity during the summer months is 115°, during the 4 winter months on an average of 65°, and thus far the investigation of the effects of compression and transmission on the candle power and heat units of the manufactured coal gas has not been fully ascertained, suffice to say with the plant in question, the quality of gas does not appear to suffer in candle power by comparison with the same gas distributed in the large low pressure mains. This may be possibly accounted for, as there is no rapid condensation to reduce the initial power of the gas, even in the c lder weather months, through plant being located in the South where the frost seldom more than enters the crust of the earth and, therefore, the mains, although laid shallow, are not affected. It is now being generally admitted, from investigation of the effects of coal gas compression, that same does not affect the fixed gases to any great extent where the work is carried on above the critical pressure, but where vapors are dealt with, which can be condensed, attention must be paid to that point. However, whatever the barriers are in the way of high pressure, the benefits derived overbalance them many fold. Where proper distribution of gas in low pressure mains is bad, and conditions become acute, high pressure work comes to the relief. Large deliveries can be obtained through small pipes by this system. Naphthaline, water and other stoppages are practically unknown, and the service to the consumer is always satisfactory, as there is an excess of pressure on the inlet side of the governor, which insures an unvarying pressure on the house pipe, so that if more volume of gas is needed it is obtained without reducing the pressure.

Again, high pressure transmission can be used to supply several small towns, which are already piped with mains for low pressure, and particularly, if the town is improperly piped and the service is unsatisfactory, a small high pressure loop may be used to surround the town and feed through small district governors into the dead ends of the low pressure system, or in some cases, a high pressure spine may be run through the middle of the town feeding into the low pressure system on each side through small district governors.

There is also a possibility of high pressure gas playing a part in this country in public street lighting. From the "Gas World" it is reported that the Committee on Street Lighting for the City of London, which visited the Continent to investigate the public lighting conditions, visited 8 cities and have recommended high pressure incandescent gas lamps with inverted burners. In the future incandescent gas lighting only will be used in Berlin. Some of the plans on some streets will have inverted high pressure gas lamps of 4,000-candle power, other streets 2,000-candle power, and again other streets of less importance 1,000 candle power.

There should be no hesitancy at this time and with experience had to break away from the old and established practices and install high pressure system, particularly new gas works in a city ever so large, or town ever so small in population.

Designs of Arches for Lights.

[Prepared for the JOURNAL, by "R."]

Illuminating engineers have been quite busy in recent years promoting schemes for the use of lights in connection with arches. In fact, there are in use illuminated arches for the household, in which the entrance to the studio or the porch may be brilliantly shown with evenly distributed lights arranged along the lines of the curves of the arches and alcove. There are also places for the arches in modern forms of garages where certain night illumination is needed for lighting up the entrances and front of the automobile resting places.

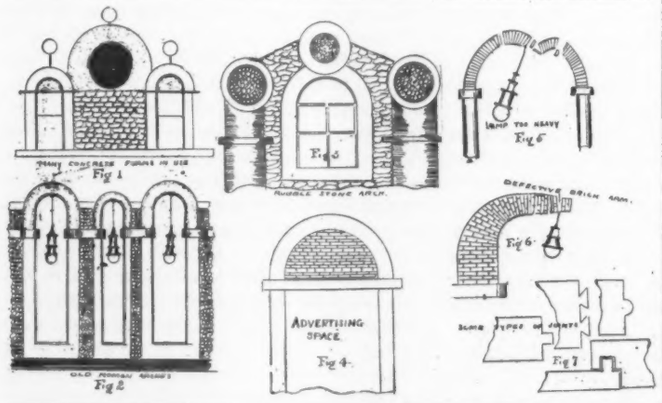
Then, again, another class of illuminated arches may be seen in service for purposes of advertising. Arches are arranged over the fronts of the stores in many of the great cities, and large department stores, in which lighted arches of various modern and ancient pattern are planned for purposes of drawing the observation of the buying patronage are not at all infrequent. Further, arches are to be found in all manner of forms in the grounds of the wealthy, and some of these forms are finished to the point of glowing with gas or other forms of lights. The general introduction of concrete shapes has aided materially in the placing of illuminated arches for all manner of purposes.

Latterly, in these days of huge displays in commemorative account, arches may be found lining or covering the streets of cities where some important public event may be in progress. Besides groined arches of brick, other types of wood and cement are common. There are also metal arches which require the ingenuity of the lighting engineers to light up, in fact, arches are of many sorts and are put to many uses.

Some very unique types of arches are in use in different parts of the country, and the annexed illustrations are of arches intended for the display of illuminants in connection therewith. Fig. 1 is a type of concrete arch made with a center rubble stone effect. The ring top is of concrete and the framework for the plate windows is of common masonry. The illumination consists of one arc light adjusted above the center of each of the frames. The gas pipe for conveying the gas to the lights is run through the concrete composition or along the back of the frame service. An old Roman style of arch is shown in Fig. 2, on which three outdoor inverted arc lights hang in the windows. The great improvement in inverted outdoor lamps for such service has made it possible to utilize this form of gas illumination in many instances. The Welsbach system of street lighting is another factor which has been of great usefulness in the instance of providing illumination for arches and similar structures. In fact, gas arcs of various patterns have been important in determining the practical use of many improvements in general building construction.

The rubble stone arch effect, shown in Fig. 3, is a structure in which the side pillars form an imposing element. These pillars are of concrete, and the rubble composition is simply a conglomerate of odd sizes of round and smooth stones cemented in place. The illumination is derived from gas arcs properly disposed about the arch, as conditions may require. In fact, some of the designers of illuminated arches do not adjust the lamps at all to the arches until after these arches are sold, thus giving the buyer an opportunity to select the style of illuminant wished for. Perhaps the illumination is to be subdued and presented only through colored glass; on the other hand, the desire may be to make the window a lighting factor in some plan, or the arch may be intended for purposes of advertising. In case the pattern is for advertising, the space is usually left clear, as in Fig. 4. Then whatever advertising matter the promoter wishes to put forth can be painted in letters on the window plate. The illumination back of the window will reflect through the letters, making the letters stand out quite plainly. It is necessary that the designer of illuminated arches be careful in the selection of material and the placing of the same. It must be borne in mind that, when weighty arc lamps and metal pipes for carrying gas are added, that the strain may be more than the slender arch can bear; hence, in one instance, where the proper attention was not given to this matter, the arch pulled

down beneath the weight of the lamp, as in Fig. 5. In another case the designers erected an arch of the half-circle form, as in Fig. 6. As soon as the pull of weight of the swaying lamp was on the brick arm the weight shattered the masonry, causing the same to collapse and the lamp to fall. Fig. 7 shows a number of forms of joints employed



in some of the masonry used in composing the arches. There are the dovetail, lock and other patterns of joints, all of which are useful in modeling arches for creating possible illuminating effects.

Interesting Legal Opinions
RESPECTING GAS PRACTICE.

[Prepared for the JOURNAL by MR. JOHN EDSON BRADY, Attorney-at-Law.]

Tax on "Gross Earnings" of Gas Companies.—It has recently been held by the New York Court of Appeals, in the case of People *ex rel.* Westchester Lighting Company *v.* Gans, reported in 92 N. E. Rep., 230, that, under the New York statute, imposing an annual tax upon the "gross earnings" of gas and other companies, the cost of material used by a gas company and converted into gas is not to be deducted from the receipts of the company in determining its gross earnings. The statute in question, which is Section 186 of the Tax Law, reads as follows:

"Franchise tax on water works companies, gas companies, electric or steam heating, lighting and power companies. Every corporation, joint stock company or association formed for supplying water or gas, or for electric or steam heating, lighting or power purposes, shall pay to the State, for the privilege of exercising its corporate franchise, or carrying on its business in such corporate or organized capacity in this State, an annual tax which shall be five-tenths of one per centum upon its gross earnings from all sources within this State, and 3 per cent. upon the amount of dividends declared or paid in excess of 4 per centum upon the actual amount of paid-up capital employed by such corporation, joint stock company or association."

This statute was amended, in 1907, by the addition of the following: "The term 'gross earnings' as used in this section means all receipts from the employment of capital without any deduction."

The complaining company objected to the determination of the State Comptroller, in that he included in the gross earnings amounts which represented the "cost of raw materials converted into gas and electric current." It was argued that, notwithstanding the amendment, the statute still limited receipts, for the purposes of taxation, to such as resulted from the "employment of capital," which would exclude receipts representing the replacement of capital. With reference to this the Court said:

"The argument has its force unquestionably. The bituminous, or coking coal, which is placed in retorts for the production of coal gas, or the anthracite coal, or coke, through which, when in an incandescent state, steam is passed, for the production of water gas, or the coal which, used as fuel, is converted into power and produces electricity, all, indeed, represent investments, or the employment, of capital and the return of the cost in the price of the product is a return of capital. But the argument does not suffice to meet the objection that the Legislature meant to enlarge the scope of the franchise tax by including all moneys that were received as products of all uses of corporate capital, 'without any deduction.' Doubtless the legislative intent is inartistically expressed; but, if that intent can be spelled out from the words of the statute, effect must be given to it. The language being explicit and the words being free from ambiguity, it is not allowable to resort to other means of interpretation."

It was further said in the opinion:

"It will not do for the courts to refuse a construction of a statute in accordance with the presumed legislative intent because clumsily worded. In this amendment it cannot be denied that the Legislature has chosen to give a definition to the term 'gross earnings,' which makes it include all receipts, and caps its mandate, in that respect, by adding the words 'without any deduction.' When the statute provides for taxing "gross earnings from all sources,' and adds that that means 'all receipts from the employment of capital without deduction,' however the language offends against the normal concept, we must regard the law as classifying with earnings, for the purpose of the tax, all receipts from the use of capital. That is what the Legislature has done. Its enactment measures the tax for the privilege of exercising the corporate franchises by a percentage upon all receipts of the company, which the use of its capital originated."

Before the 1907 amendment, defining "gross earnings," was added to the statute, the question here involved arose, and was disposed of in the case of the People of the State of New York, *ex rel.* Brooklyn Union Gas Company *v.* William J. Morgan, as Comptroller of the State of New York. The case is reported in 114 N. Y. App. Div., 266. It there appeared that the gross receipts of the Company, for the year ending October 31, 1898, were $3,805,626.15, and on this amount the Comptroller fixed the tax of five-tenths of 1 per cent. under the statute, amounting to $19,028.13. It was contended by the Company that the sum of $947,546.28, which represented money spent for raw material, to be converted into gas and sold to consumers, should be deducted. This contention was concurred in by the court, which wrote as follows in support thereof:

"The Comptroller has fixed the tax, not on the 'gross earnings' of the relator (gas company) as required by the statute, but on its gross receipts. Capital of a corporation, which must first be invested before it begins to earn anything, cannot be said to be a part of the earnings of such corporation, merely because it is turned into cash and thus in one sense becomes a receipt of the corporation. Earnings do not include capital, but are the productions or outgrowth of capital. In some cases, like the one now under consideration, the capital must be supplemented by labor and such other expenditures as may be incidental to the development of the manufactured product from the raw material. Such incidental expenditures are doubtless part of the 'gross earnings.' If the coal in question had been used under the boilers for developing heat, such coal, like labor, would be merely an incidental expenditure in the process of converting the capital from one form into another, and should probably be included as part of the 'gross earnings' of the relator. However, the evidence is that the coal in question was not used in generating heat, but was of a different kind and was converted into gas. In fixing the 'gross earnings' of the relator there should, therefore, have been deducted from the gross receipts the cost of the raw material, which amounted to the said sum of $947,546.28."

It was probably to escape the effect of this decision that the statute was amended. Undoubtedly the legislature meant, by the amendment, to make it possible to tax gas and other companies annually on their gross receipts, including the amount used by the companies in the purchase of raw materials. If so, it is unfortunate that that intention was not more clearly expressed. Had the amendment been free from ambiguity much costly and tedious litigation might have been avoided.

Special English Correspondence.
COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, August 10, 1910.

Public Lighting in London.—A Neglected Department.—The Present and the Future.

For a very long time the City of London—by which term is indicated a comparatively small area embracing the central part of the metropolis, extending from Billingsgate to Temple Bar—lay under the reproach of being the worst lighted city in Europe. It was no-

toriously a long way behind the principal provincial cities in that respect. Of late years, however, a more enterprising spirit has prevailed amongst the city fathers. They have recognized the fact that modern conditions of life and society call for an efficient lighting of the public thoroughfares, sufficient to enable passers to recognize each other, or to read names of streets and other public announcements, numbers on houses, particulars of destination of omnibuses and tram cars, etc. And in no way has this been more assisted than by the gradual introduction of modern systems of lighting by gas, which are now generally admitted to be far cheaper and more efficient than any of the so called rival systems. It is worthy of note, too, that this increase of enterprise is coincident with the rattling of the dry bones that has been such a notable feature at Horseferry Road, Westminster, the headquarters of the Gas Light and Coke Company, who are responsible for the gas supply in the district, and that the introduction of improved methods in connection with gas lighting has not been confined to the illumination of public thoroughfares.

The report of the engineer to the Public Health Department for the year 1909 is remarkable for the plain way in which the consumption per hour, the efficiency and the cost of the various systems are set out. The man in the street can clearly understand, and there will be no excuse in future for any of the glaring "mistakes" on this score that have been such a remarkable feature in certain interested quarters in the past. The total number of lamps paid for during the year was 2,720, of which 2,601 were low pressure, and with a few exceptions consumed 4½ cubic feet per hour each and yielded an illuminating power of 60 to 70 candles. Owing to the narrowness of the streets, they are chiefly carried on brackets at a height of 12 feet from the ground, and the total annual cost, exclusive of capital charges, is £3 5s. 7d. per lamp, gas being supplied at a special price of 2s. 2d. per 1,000 cubic feet. The district of Fleet street and Chancery Lane has been lighted by 17 high pressure inverted gas lamps of the Keith type, carried on brackets fixed to the house fronts and projecting over the footway. These have displaced 36 double burner upright incandescent lamps on the footways, and two high pressure lamps on street refuges. There is a 6 inch high pressure main laid down the center line of the road, with branch services to each lamp, supplied with gas under 54 inches water pressure, equivalent to 4 inches of mercury. Each lamp uses 25 cubic feet of gas per hour and gives 1,500 candles, a duty of 60 candles per cubic foot of gas, and the cost, with gas at 2s. 2d. per 1,000 cubic feet is £15 2s. 6d. per lamp, the gas company providing the whole of the necessary plant. There are 102 other high pressure Keith lamps, of which 42 single upright burner lamps are fixed in the neighborhood of Billingsgate, and are supplied with gas at 10 inches water pressure, by a water driven compressor. The gas company provide the whole of the plant, each lamp uses 10 cubic feet of gas per hour, and gives an illuminating value of 300 candles, and costs £6 13s. 6d. These and the smaller power lamps are 60 to 70 feet apart measured on the diagonal. In Queen Victoria street there are 45 upright 2-burner lamps, each giving 600 candles and costing £12. The street is 70 feet wide, and these lamps are fixed on columns on the footways, at a height of 13½ feet from the ground, and 100 feet apart on the diagonal. There are also Keith lamps of various sizes, 2 to 6-burner, and giving 1,000 to 3,000-candle power, on the refuges at important centers or crossings. Two double and one single Carpenter's inverted burners have been tried. The consumption per burner is 4 cubic feet per hour and the illuminating value 120 candles. The Carpenter burner is the only one that attains a duty of 30 candles per cubic foot at ordinary rates of consumption and pressure.

The principal feature elicited by this report is the fact that 5 cubic feet of gas, rated as 16-candle, and, therefore, giving a duty of 3.2 candles per cubic foot, can be made to yield *nearly* 20 *times that value.*

With this important fact in view, it is strange that so little attention is devoted by the profession generally to the development and extension of gas lighting. This branch has been always left to take care of itself. While the gas cooker and gas fire are never overlooked in the discussions at meetings of gas managers, it is surprising how little is said on the subject of lighting. Even in these days, when the commercial end of the undertaking is so much in evidence, ideas seem to be attracted towards new departures, all involving additional outlay, rather than in the direction of encouraging and developing existing resources. One wonders what the general result would have been if as much care had been devoted to lighting as to cooking and warming appliances, or to the placing of slot meters, and if the general lighting business had been assisted by such inducements as free fixing, apparatus on hire, lectures and demonstrations, etc. Even at exhibitions intended to encourage the use of gas, there is a tendency to allow the lighting to take a back seat. The result of this policy is to encourage the public to believe that there is "something" in the numerous representations that are continually being placed before them to the effect that gas as a lighting agent, if not absolutely played out, is antiquated and only worthy a very limited and inferior place. The cheapness is obvious. But does not cheapness, standing by itself, also carry an impression of nastiness, and there is an impression of this sort growing up, and the fact that gas people do not trouble to contradict it is a great feature in its favor. Gas lighting should be energetically advocated, not on the score of cheapness alone, but on account of other qualities that carry greater weight in this luxury loving age, such as the purity of the light, rendering it possible to do delicate work with comfort and without injury to the eyesight. Then the numerous sizes of upright or of inverted burners that are available enable a very great variety and power of adaptability to particular requirements. Yet one might be excused, if after taking a walk through the principal streets of a town after dark, he supposed that there were something less than half a dozen different patterns of burners available. Every provincial gas undertaking seems to take up one particular pattern as a fancy, and to use it anywhere and everywhere to the exclusion of others. High power is no new idea, but there are to-day large provincial towns in which not a single installation of this modern form of lighting is in use. Ornamental gas lighting is almost unknown. Can it be wondered at that when a gentleman wishes to have his handsome residence lighted in high-class style, or a lady wishes to make her drawingroom in London look pretty, the claims of gas do not receive anything like adequate consideration. We hear a great deal about the capabilities of the heating business, and it will be possible to make out an equally strong case for lighting. It is not dependent upon the vagaries of atmospheric temperature, but is practically regular according to the season of the year. A well kept system of gas lighting is the best possible advertisement, because it is always in view. People may appreciate the excellence of the cooking, and when they are told that a gas cooker was the agent used the subject attracts their attention for a few minutes and is then forgotten. If the room is warmed by a gas fire, the apparatus may come in for a passing notice and word of praise. But the lights over the table are always in view, and whatever the evening occupation may be—business, study or amusement—a good light is indispensable. I shall probably be regarded as hopelessly out of date by the rising generation, but I do think that before adopting heroic methods of increasing the demand for gas, such as offering it for heating purposes at a ridiculous and unfair discount, a little more might be done for the chief department of gas consumption. Instead of offering 6d. or 1s. discount per 1,000 cubic feet for new business, a plan that invariably involves difficulties and discontent with the other existing connection, why not spend 1d. or 2d. per 1,000 cubic feet in fostering and encouraging the use of gas for lighting. A new service pipe, or 100 of them, is good, but an increased consumption on 1, or on 100 existing ones, is better.

There is a story told of a man who attended a suffragette meeting, and in the course of the proceedings a speaker remarked that in 100 years' time every woman would have a vote, and that men would not enjoy the comfort and independence that fall to their lot at present. To this he replied that the statement made no difference to him. "Why not," said the astonished orator (should it be *oratress?* Wherever is that dictionary got to?) "Well you see," he replied, "I shall not be here in 100 years." It may be recommended to the consideration of a shareholder in the Gas Light and Coke Company, who is apparently under the impression that gas companies should make hay while the sun shines, or in other words, pay off their capital liabilities at the rate of 1 or 2 per cent. per annum, so as to get the whole liquidated before the supply of coal gives out. The anthracite coal in South Wales, he said, is nearly exhausted, and this is not of much consequence, seeing that not a ton of Welsh anthracite is used for making town gas. It is too expensive. But the next point is more interesting, and that is that the disappearing Welsh product will be followed in 60 or 70 year's time by the exhaustion of English gas coal. There is a slight difference of opinion extending from 60 years up to some thousands as to the durability of our coal supply, and occasionally some harebrained enthusiast who favors the shorter period raises the question of conserving the coal supply. Gas engineers and directors, if only assured of 60 years' supply of coal, can find plenty of details that call for much more attention, without going beyond the report of the Directors and the address of the Governor of the Company.

Take for example the statement: "Among the causes that have led to the improvement apparent in the companies' position, not the least is the better training and education of the outdoor staff and the more intelligent service of the public consequent thereon." During the summer time the fitters are thoroughly grounded in the principles of their work and taught how to reply to the inquiries of customers. The staff instruction in the winter gives increasingly good results, and there are now 51 young apprentices who are receiving practical instruction in the work and duties of fitters. The service of lady demonstrators, who make house-to-house visits for the purpose of advising consumers as to the economical use of gas for cooking, was giving satisfaction and doing good work, instruction having been given to 6,420 consumers during the half year. But beyond all these aids "is the stimulus of mutual interest and effort which has been advanced by copartnership." After a full year's experience of this system it has fully realized expectations, and there are now over 9,000 copartners, holding a total interest in the company of £66,377.

Now the point of all this is that the company have raised and improved the status of the people who actually come into contact with the consumer. Many of the public, when they require information, prefer to get it from an artisan or laborer. They have an idea that particulars so attained are more reliable, and that the workman is more likely to be unsophisticated than his superior officer. This assumption is not universally correct, as it is by no means uncommon for serious mischief to be done by ignorant though well meaning men, who rely upon imagination to cover technical ignorance, or who establish the habit of giving an answer that is more calculated to get rid of the inquirer, than to assist or be of use to him. The education of the workman, to such an extent as to enable him to give a concise, correct and understandable reply to any inquiry relating to the methods of using gas appliances, is a great step towards securing proper education of the consumer. People will take this method of securing information, when they will not attend lectures or read printed matter. We may therefore expect that the satisfactory features mentioned by the Governor will become more and more apparent in the future, and that they will be so marked as to lead to a general improvement in the education and status of the man who "sees to the gas." There is a strong feeling abroad in favor of more sympathy and closer association throughout all departments of the gas undertaking, and in no way is this more likely to be encouraged than by copartnership, which gives every man a definite personal interest in the concern. The wage-earner, very frequently, is inclined to limit his interest to the consideration of how to get through his task in a manner that will avoid unpleasant interference from headquarters, but at the same time involve as little physical discomfort or exertion to himself as may be practicable.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

966,480. Gas Plate. H. W. Schulze, Milwaukee, Wis.

966,548. Gas Burner. L. C. Hiller, Meriden, Conn.

966,611. Pressure Controlled Gas Valve. F. B. Shuster, New Haven, Conn.

966,690. Electrical Gas Lighting Device. E. R. Joseph, Elkhart, Ind.

966,718. Gas Producer. W. Thomas, Vancouver, British Columbia, Canada.

966,927. Filament for Incandescent Gas Lamp Mantles. R. Laigle, Paris, France.

966,968. Gas Tank. H. Watson, Pittsburgh, Pa., assignor to Searchlight Gas Company, Warren, O.

967,183. Gas Generator. N. Goodyear, New York City, assignor to J. B. Colt Company, same place.

967,212. Gas Cleaner. L. P. Lowe, San Francisco, Cal.

967,213. Process of Making Producer Gas. L. P. Lowe, San Francisco, Cal.

967,417. Gas Burner. A. G. McKee, Cleveland, O.

967,459. Suction Gas Producer. C. L. Straub, Milwaukee, Wis., assignor to Loomis-Pettibone Company.

967,637. Rotary Grate for Gas Producers. E. Hilger, Dusseldorf, Germany.

967,672. Gasholder. H. Rauch, Munich, Germany, assignor to Ofenbau-Gesellschaft mit beschrankter Haftung, same place.

Items of Interest
FROM VARIOUS LOCALITIES.

MR. FRANK D. MURPHY, formerly Manager of the business departments of the Elmira (N. Y.) gas and electric corporations, has been appointed Superintendent in a like capacity at Altoona, Pa.

MANAGER HENRY A. WHEELER, of the Bayonne branch of the Public Service Gas Company, of New Jersey, has lost a boon companion in the person of his charming daughter, Jessie O. Wheeler, who was joined in marriage, the afternoon of the 17th inst., to Mr. Thomas Agnew, Principal of Public School, No. 6, Bayonne. The Rev. A. L. Langley, Rector of Trinity Episcopal Church, tied the knot.

THE gas plant of the Pintsch Compressing Company, which was originally constructed in Ogden, Utah, in 1895, will be reconstructed. Its first capacity was 40,000 cubic feet per diem; its last will be 200,000 cubic feet.

THE special election, held about a week ago in Belle Plaine, Ia., to determine whether or not a franchise should be granted to Mr. Edward Nichols and associates for the operation there of a gas works, was determined by the affirmants. The vote was 269 in favor; 18 against.

MESSRS. D. J. JOHNSTON, O. E. Gorman and G. W. Good have been appointed a commission to determine the value of the property that is to be taken from the Springfield (Mo.) Gas and Electric Company, for the uses of the 'Frisco Railroad Company.

MR. E. F. DAVIS, formerly connected with the George M. Clark Company, of Detroit, Mich., has been appointed assistant to the Manager of the New Business division of the Philadelphia Suburban Gas and Electric Company, of Chester, Pa.

THE ground plot recently purchased by the Consolidated Gas and Electric Company, of Los Angeles, Cal., whereon the Company proposes to erect a huge storage holder, cost the round sum of $60,000. It comprises an entire square, bounded by 10th and 11th streets, and L and M streets.

A GLORIOUS life was ended when death closed the earthly career of Mrs. Jane Armstrong, mother of Mr. John A. Britton, Secretary of the Pacific Coast Gas Association. Her death occurred in the residence of her son-in law, Mr. W. D. Smith, of Adams Point, Cal., the afternoon of Sunday, the 7th inst. She was in her 90th year.

THAT indefatigable man of business, Mr. Murdock, of the Indiana Lighing Company, has declared (and he usually is in line with things that happen) that Marion, Ind., shall have a gas plant up to its needs, even if such determination means the construction of a works to produce gas of the artificial sort; a works up to supplying any demand that may be made on it.

THE succession of Mr. C. N. Chubb, formerly with the Sioux Falls (S. D.) Gas Company, to the vacancy occasioned by the resignation of Mr. S. W. Fowler from the Michigan City (Ind.) division of the Northern Indiana Gas and Electric Company, becomes effective September 1st.

"G. W. Y." forwarded the following from Roswell, N. M., under date of the 18th inst.: "Messrs. Otis & Hough, of Cleveland, O., have consolidated the Roswell Gas Company and the Roswell Electric Company, under name of the Roswell Gas and Electric Company, with the following officers: President, L. K. McGaffey; Secretary and Treasurer, George W. York, of Cleveland, O. The financial end of the investment will be handled by Mr. D. W. Low, of Lansing, Mich. Mr. W. D. Sweet will be retained as resident Manager."

THE proprietors of the Baton Rouge (La.) Electric and Gas Company are up in arms over the increase in the rate charged for gas used for fuel purposes. The old rate was $1.25 net per 1,000, whereas the new one is $1.60, gross, $1.50—the net is operative on bills paid by the 10th of the month. However, the Baton Rouge outfit may now be deemed believers in the urgency of the usefulness of electric currents.

JUDGE ARCHBOLD, of the United States Circuit Court for the concerned Pennsylvania district, sitting in Scranton some days ago, ordered that the plant of the Berwick Gas Company be sold at auction at a date to be fixed later on. He directs that the minimum acceptable

bid shall not be less than $30,000. The Company has for some time been in the hands of a receiver, and the proceeding above noted was instituted by the Union Trust Company, of Lancaster, Pa., Trustee under the mortgage issued by it originally.

THE capital stock of the Manchester (N. H.) Gas Light Company has been increased from $100,000 to $300,000.

THE regular quarterly dividend of 1¼ per cent. was declared the 18th inst. by the Directors of the Brooklyn Union (N. Y.) Gas Company, which action was quite a disappointment to a usually well informed coterie, who confidently expected, if not an increase in the regular rate, at least an extra of 2¼. The dividend is payable October 1st.

MR. H. L. DOHERTY has resigned as President of the American Gas and Electric Company, and his successor is Mr. R. E. Bead, formerly First Vice President of the concern. Mr. Doherty remains on the Board of Directors.

MR. W. H. HAMMON, Engineer to and for the Busch-Everett syndicate, that has to do with the utilization of the Caddo natural gas fields, has been induced by the capitalists who are concerned in the proposed construction of the Houston Heights (Tex.) Gas Company, to act in the capacity of their supervising engineer. Work on this venture will be commenced in the fall.

IN connection with the increase in the annual dividend rate of the Laclede Gas Light Company, of St. Louis, to 7 per cent. from 6 per cent., the Directors made the following statement: The gross earnings for the first half of the present year aggregated $2,234,907.87; the net income, $1,042,272.99; the net earnings, $943,353.79, and the surplus, $383,498.95. As compared with the corresponding period of 1909, the gross earnings exhibited an increase of 9.72 per cent.; an increase of 14.40 in net income; an increase of 10.02 per cent. in net earnings, and a gain of 30 per cent. in the surplus. The assets are figured at $33,466,901.89.

"L. M. T.," writing from Springfield, Ills., under date of the 17th inst., forwards the following mention: "The bickerings between certain interests concerned in the proprietorship of the Plateville (Wis.) Gas Company, have culminated in the placing of the concern in the hand of a receiver. Mr. W. C. Butterworth, who has been in charge of the plant, was named as temporary receiver, and he will continue to so act until the Trustees name one of their body to take control. Those in a position to know declare the primary cause of the present difficulty was the inability to float the securities, while the immediate cause was the paucity of money to permit of extending the system and making the plant self-sustaining, combined with the lack of necessary funds to continue operations until the Company became self-sustaining. The temporary receiver was granted on the prayers and application of W. C. Butterworth, Jas. McCarren & Son, of Rockford, Ills., and a Plateville creditor. On the face of the accounts the nominal assets of the Plateville Gas Company are equal to the liabilities, and a reorganization of the Company is looked for; I may add that, if it were not for some personal 'items' that entered into the frictionating, the Company would never have been written down a bankrupt; more's the pity.

"THEY have a Mayor in Tacoma whose name is Fawcett, and the pronouncing thereof causes one to think that he is rightly named, that is he never does anything that is not done at high pressure, and when he has turned on his mighty mind to consider a weighty matter, he surely slops over with much outrush. Further, when he is turned on he goes with a gurgle which is hard to suppress; even when the tip is shut tight, there is quite more than the suspicion of a trickle. Of course, he is of the reform variety, and his last blow off had reference to the selling price maintained by the Tacoma Gas Company, which price is $1.35 gross, or $1.25 net. Anybody actuated by reasonable pulsation will admit at once that such (the net) rate is not only fair, but low, especially remembering the nature of the service rendered, which is of the best type. Another thing, the Tacoma gas men have had small returns on the money invested, for about every dollar that its management can spare is being put into main extensions in the fast developing outlying sections.—DAVIES."

THIS from the Boston *Herald* of the 17th inst. is worth reading: Following the remarks made by the authorities in respect of the public street lighting, on the 16th inst., Superintendent of Streets (Mr. Rourke) recommended to the Mayor several changes, among them being the extension of the electric light zone. The recommendations were approved by the Mayor. Superintendent Rourke's letter follows: "In regard to the letter of July 22, 1910, addressed to you by the finance commission, making certain recommendations in regard to the lighting of the city of Boston, I beg to say that I have gone into the matter quite extensively, and have consulted several gas and electric engineers in regard to the same, and it seems to me that the proposition of automatic lighting is at present in a state of evolution, and has not as yet reached a condition of perfection which would warrant me in recommending the city of Boston adopting them to the amount of 12,000 lamps. There are in the underground electric zone of Boston 1,500 gas lamps. I would recommend the immediate replacement of these by electric tungsten lights, which will save the city $4,300 per year. I would further recommend that we advertise for bids for lighting the remaining gas lamps of the city, approximately 10,500, for a period of 2 years. If we receive bids that show no material reduction in the present price of gas lighting, I would recommend that the electric lighting zone be extended as fast as possible."

THE Boston Central Labor Union seems very much incensed over the thought that the city may equip its public street lamps with devices for the lighting and extinguishing of the lamps on automatic account. This conclusion is arrived at from the speeches made by several delegates of the Central Labor Union, at a meeting thereof in Boston the evening of the 21st inst.

MAYOR MOORE, of Macon, Ga., has notified the proprietors of the Macon Gas Light and Water Company that the city proposes to acquire the plants of the Company at the expiration of the present contract (the latter expires on some date in 1911), for operation on public account. It is likely this notification which caused the hurried return from abroad of Mr. Arthur E. Boardman. It is our satisfactory task in connection with the latter to say that he is as spry as ever—and that is saying much—and that the lengthy visit to and through the old country seems to have made of him a truly steadfast Georgian.

THE proprietors of the Long Gas Company, of Nowata, Okla., have filed a certificate indicating a decrease in its capital stock of $20,000. It was $50,000; it is $30,000.

THE proprietors of the South Shore (L. I.) Gas Company, the plant of which is to be located in West Babylon, assert that the pipe system will be in Amityville by October 15th, and that the plant will be in readiness to supply gas by December 1st. If that promise is made good much work will have been accomplished in a short space of time.

AN examination for an Assistant Inspector of gas will shortly be held by the Public Service Commission, Second New York District. The duties are to inspect and test gas for its purity and illuminating value. The salary is $1,200, and necessary travelling expenses. Candidates must be graduates in chemistry from a recognized college or university, or have an "equivalent" education. The subjects of the examination, with their relative contest marks, are: General and theoretical chemistry, quanitative analysis, photometry and manufacture, 7; education, experience and special training, 3.

AT a meeting of the shareholders in the Hartford (Conn.) Gas Securities Company, held some days ago, it was formally voted to dissolve the corporation and to ratify the action of the Directors in deciding to distribute its shares amongst the shareholders of the City Gas Light Company.

MUCH mystery veils the sudden disappearance of Mr. John S. Fielding, Cashier of the Northwestern Gas Light and Coke Company, whose disappearance from his usual stopping places cannot be accounted for. A cursory examination of his accounts revealed the fact that these were all right. All Evanston, Ills., which is the headquarters of the named Company, are much perturbed over his disappearance, for his popularity there was unbounded.

WITH much satisfaction we report that Mr. George W. Mansfield, Superintendent of the Beverly (Mass.) Gas Works, has about recovered from the injuries sustained in an explosion (slight in itself) at that plant some time ago.

MR. E. H. ROBINSON has resigned the position of Auditor of the Schenectady (N. Y.) Illuminating Company. His successor is Mr. Joseph Brucker.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

MONDAY, AUGUST 29, 1910.

The Market for Gas Securities.

The low point in Consolidated for the week was 127¼, and the quotation for this morning (Friday) was 129 to 129¼. Sales were light, and there is very little short interest in Consolidated just now. The traders (and they are the ones responsible for any marked up-or-down in the shares) are fighting shy of the shares. President Cortelyou and his course with the Company, since his naming to its main excutive post, keep on winning favor every minute. Not like the proverbial "new broomer" was this sage man of the world, in every good sense, for he found an excellent force to direct; his common sense told him that such subalterns as Addicks, Bradley, Bennet, Carter, et al, were pretty good men in their respective lines, and that harmony was the watchword. He counsels with them, they advise with him, and harmony in reality prevails.

The general market for gas shares is excellent, although it surely looks queer that Laclede, of St. Louis, should be quoted at lower figures just after its placing on a higher dividend plane.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

AUGUST 29.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$73,177,000	100	129	129¼
Central Union Gas Co. —				
1st 5's, due 1972, J. & J.	8,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98¼	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	•107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	131	132
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,550	500	130	—
Out-of Town Companies.				
Bay State	50,000,000	50	⅛	⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,000,000	1,000	104	105¼
Cincinnati Gas and Electric				
Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. &				
Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106½	—
Mortgages, 6's	3,600,000	—	89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	881,000	1,000	75	80
Equitable Gas & Fuel Co.,				
Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co.,				
1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108¾
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co.,				
of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	103	104
Laclede Gas Co., St. Louis	10,000,000	100	100¾	101
Preferred	2,500,000	100	90	100
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	108	108¾
" 6 per cent. scrip,				
due 1910	100,000	25	60	60½
Massachusetts Gas Compan-				
ies, of Boston	25,000,000	100	80	—
Preferred	25,000,000	100	91½	—
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co.,				
Chicago	25,000,000	100	105	106
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	375	380
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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In town of 12,000 or smaller, by young man at present employed in same capacity. Good education and excellent experience in all the work. References furnished and results in present position shown.

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A First-Class Water Gas Maker.

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Station Meters.—One 12 ft. by 12 ft., no drum; one 9 ft. 6 in. by 9 ft. 6 in., no drum; one 9 ft. by 9 ft.; one 8 ft. 3½ in. by 8 ft; one 8 ft. by 8 ft.

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Holder.—150,000 cu. ft., 2-lift, in brick tank.

Tanks.—Of various capacities and shapes.

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One 30,000 Cubic Foot Gasholder, brick tank.

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5,000 Bushels of the Best Western and Connelly Oxide.

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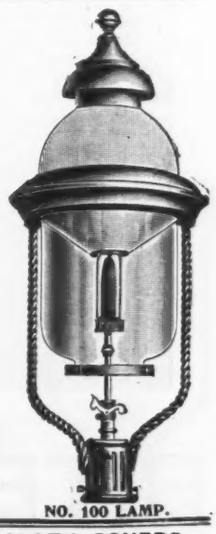

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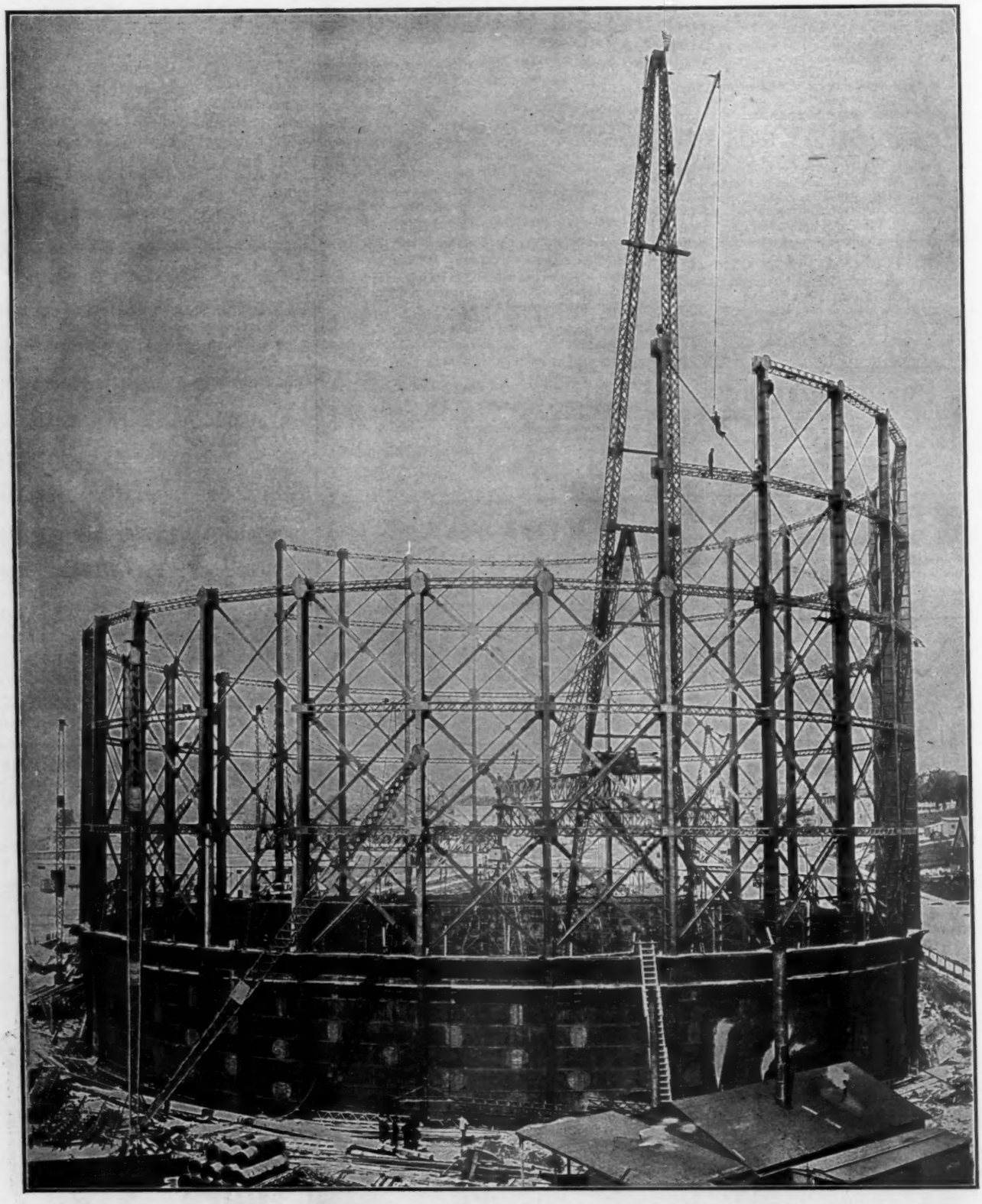

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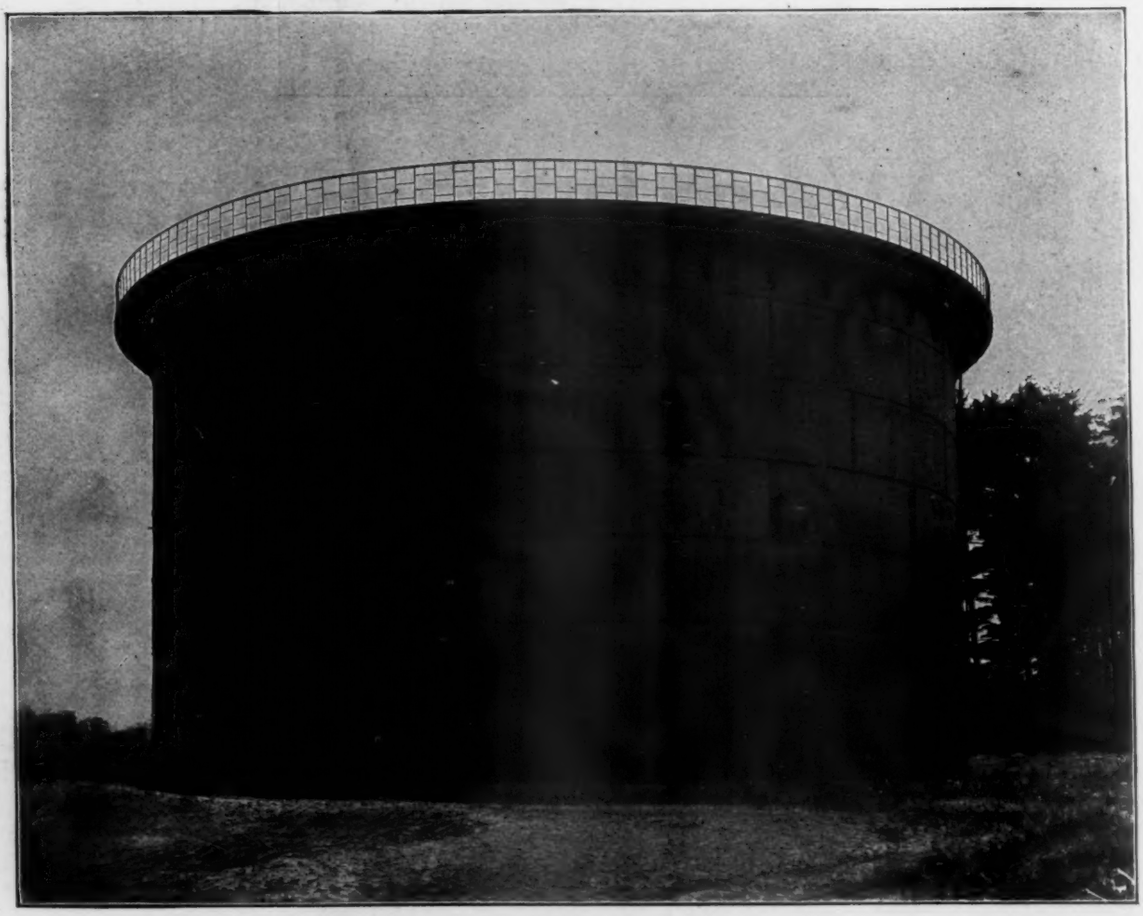

Capacity, 2,380,000 gallons. SCHENECTADY, N. Y. City Water Works. Diameter 90 feet. Height, 50 feet.

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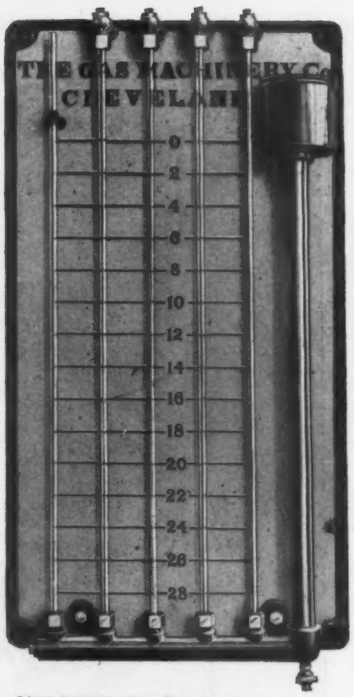

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For Gas and Electric Plants.

NEW YORK RUBBER COMPANY,

Incorporated 1851.

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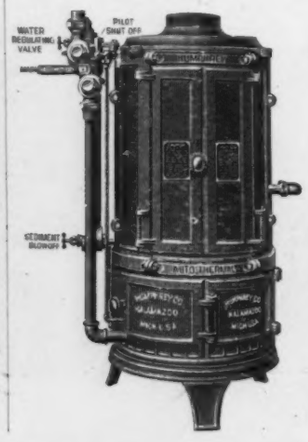

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HUMPHREY AUTOMATIC GAS WATER HEATERS

Have the valve at the top; easy and cheap to connect; a sootless bunsen flash pilot; a galvanized, rust-proof, non-clogging burner, and many oth er things making for trouble freedom and high efficiency. ∴ ∴ ∴ ∴

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WHAT WE MANUFACTURE:

Pressure Blowers,
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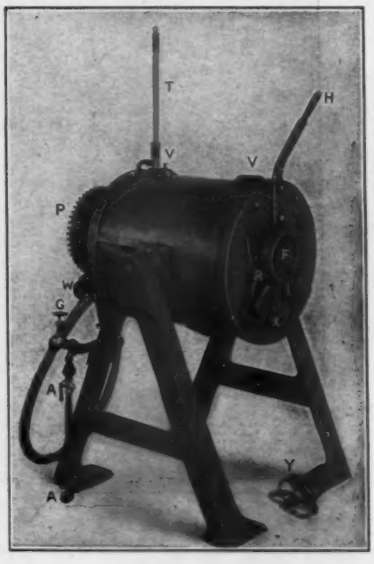
STATE

AMOUNT - -
SIZE - - -
KIND - - -

OF WORK

to be done in given time.



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AMERICAN GAS FURNACE CO.

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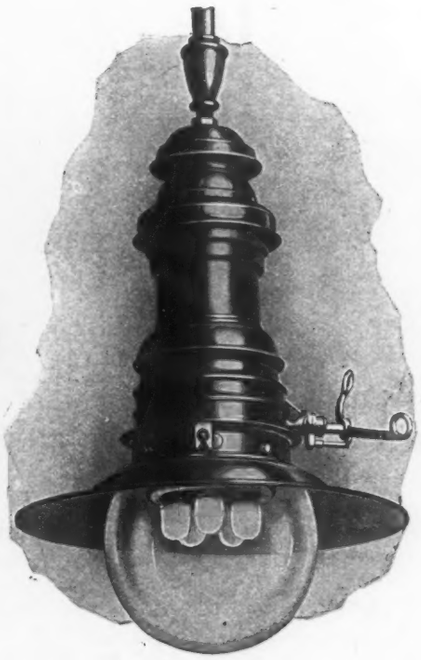
ASSOCIATE YOURSELF WITH A SUCCESS.

"THE GAS COMPANY'S LAMP."



ONCE IN, NEVER OUT.

THE HUMPHREY INVERTED GAS ARC LAMP.

GENERAL GAS LIGHT COMPANY,

KALAMAZOO. NEW YORK. SAN FRANCISCO.

"LACLEDE-CHRISTY."

THE FOLLOWING LETTERS were received within one week of each other, were entirely unsolicited, and they will speak for themselves:

Grays Harbor Gas Company

Aberdeen, Wash.

Aberdeen, Wash. June 7, '10.

Laclede-Christy Clay Products Co.,

St. Louis, Mo.

Gentlemen:—

We desire you to enter our order for one Standard Bench of 6's as per your drawing 6-B-P-A-114, being a duplicate of the bench erected for us last year, except that we desire you to omit the automatic tar and liquor overflow from the hydraulic main, and to place a three-inch flange on the bottom of the main near the right hand end for the tar overflow, and a one and one-half inch flange on the back of the main at the proper point for the liquor overflow. The main is to be separate from other mains and have separate gas off-take.

This bench will be erected on the right hand side of the bench erected by you last year, the nine-inch fire brick wall being placed against the eighteen-inch red brick wall. This bench will probably be the last one erected in this direction so we will not provide 18" fire brick wall for future arch, as suggested by you last year.

We also wish you to refill the arch of the bench of 6's erected for us by the_____Company, blue-print of which is enclosed.

Also to furnish and install six retorts and blocks for the bench erected by you last year, that is to refill from the top of the recuperator. During the winter we had an accident which damaged the bench, making the above repairs necessary.

It is our desire that you arrange this work so that as soon as you are through with the Centralia benches, your erector will come to Aberdeen. Kindly advise us if this arrangement can be made and approximate date of his arrival.

Please send us prices and specifications covering this work.

Yours very truly,

GRAYS HARBOR GAS COMPANY

CITY GAS COMPANY OF NORFOLK.

JOHN BLAIR McAFEE, PRESIDENT.
E. C. HATHAWAY, V.-PRESIDENT AND GEN'L MGR.
W. J. KEYS, SECRETARY AND TREASURER.
R. J. MARKS, GEN'L SUPT.
F. W. BONNEY, PURCHASING AGENT.

S. NORFOLK, VA. 5/31/10.

The LaClede-Christy Clay Products Co.,

St. Louis, Mo.

Gentlemen:-

We will have two arches to be filled this summer from the ash-pan up. These are the two fillings that your man put in for us two years ago, and these benches have been so satisfactory that we are going to place this order with you without competition.

Kindly give us a price, including two round firing doors for the furnace. We have two new 20 inch wide ash-pans.

We will want this work done in August of this year, if possible. We will also ask you to please see that the bricks for lining the furnaces are a little harder than they were the last time.

Requisition for this work will be sent to you after we get your prices, etc.

Very truly yours,

CITY GAS COMPANY OF NORFOLK.

By R. J. Marks

Gen'l Supt.

LACLEDE-CHRISTY CLAY PRODUCTS COMPANY,

ST. LOUIS, MO.

ISBELL-PORTER COMPANY,

NEWARK, N. J.

FOWLER'S PATENT STAND PIPES FOR MACHINE OPERATED RETORT HOUSES.

BUILD YOUR HORIZONTAL 8'S WITH 8-FOOT ARCHES AND REDUCE THE COST OF SETTINGS AND BUILDING.

CONTRACTORS FOR

COMPLETE MECHANICALLY-OPERATED RETORT HOUSES.

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, 1910. New York City. Officers: President, Wm. H. Bradley, N. Y., City Secretary, A. B. Beadle, 29 West 39th street, N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1911. ————————. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N, Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

Illuminating Engineering Society.—Annual meeting, Baltimore, Md., Oct. 1911. Meetings of Sections, monthly. President, W. H. Gardiey, Philadelphia, Pa.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June, 1911, ————————. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. 9 to 12, 1910; Aboard Boat, "Georgian Bay." Officers: President, B. O. Tippy, Grand Rapids, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 13, 14 and 15, 1911; St. Louis, Mo. Officers: President, R. J. Irvine; Secretary and Treasurer, W. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1911: Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Louis Stotz, 36 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 16, 17 and 18, 1911; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O, Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Public Utilities Association.—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1911, Reading, Pa. Officers: President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

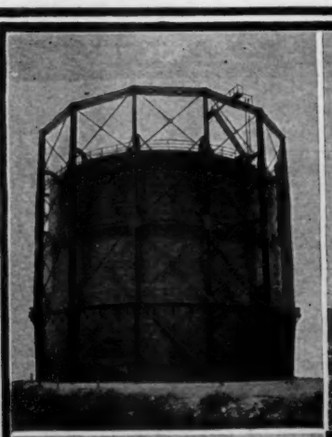
Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

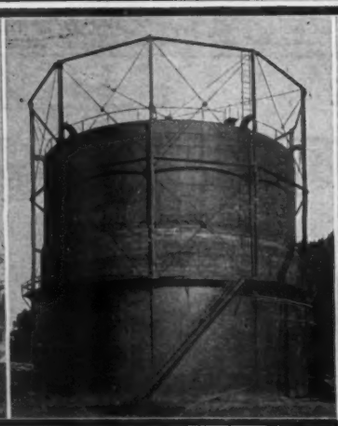
Southern Gas Association.—Annual meeting, Feb. 16, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. May, 1911, ———— Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, H. B. Head, Stephensville, Tex.

Wisconsin Gas Association.—Annual meeting, May ————, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

Directory of American Gas Companies, 1909. Price, $5.00. For Sale by A. M. Callender & Co., 42 Pine St., N. Y.





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SCRUBBERS, CONDENSERS,
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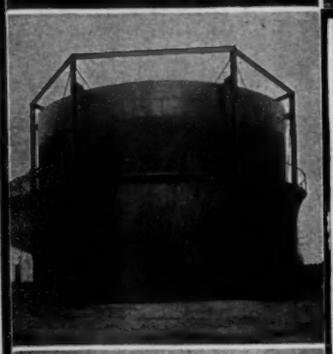
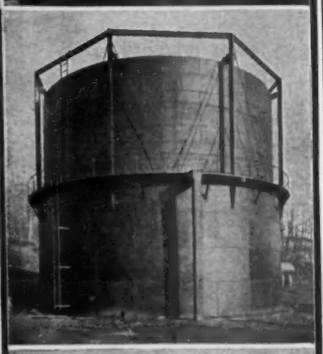
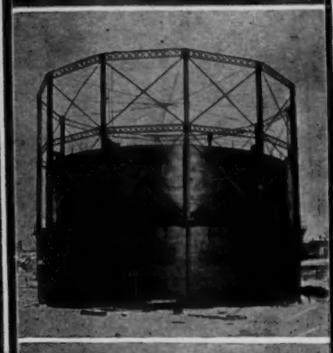
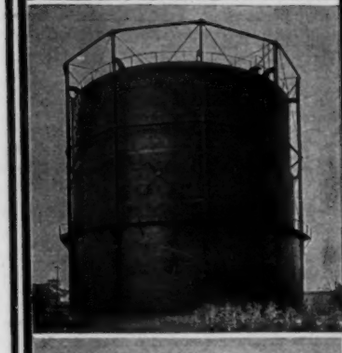



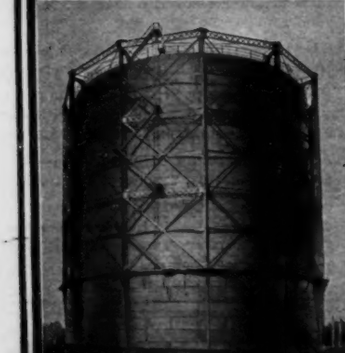
Some of the best gas engineers of the United States have passed on our designs and workmanship, resulting this year in the following contracts:

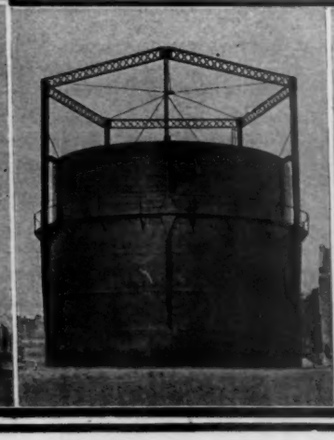
GOLDSBORO, N. C.		(completed)	30,000 c. f.
AMHERST, MASS.		(completed)	30,000
BABYLON, L. I.			31,000
GLASSBORO, N. J.		(completed)	50,000
ATLANTIC HIGHLANDS, N. J.			50,000
PORT JERVIS, N. Y.			75,000
HAMMONTON, N. J		(completed)	100,000
RALEIGH, N. C.			150,000
COATESVILLE, PA.	(Am. Gas)	(completed)	150,000
PLEASANTVILLE, N. J.		(completed)	200,000
SHAMOKIN, PA.			200,000
STEELTON, PA.			500,000
HARRISBURG, PA.	(U. G. I.)		1,500,000
NEW HAVEN, CONN.*			3,000,000

* To be completed summer 1911.









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We have a full line of sizes for all standard pressures. The design, material and workmanship is A-1. Prompt Delivery and Reasonable Prices. WHY NOT give us YOUR requirements?

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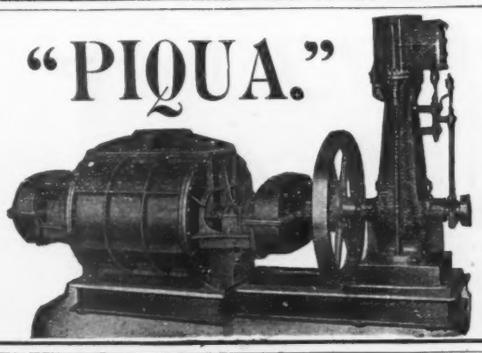

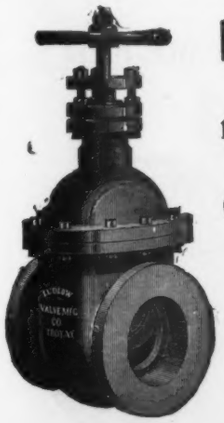

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CAST IRON FLANGED PIPE,
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Either Straight or Circular Reading Registers.

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Manufacturers of Gas Meters and Water Meters.

PUBLIC LIGHTING TABLES FOR SEPTEMBER, 1910.

[Communicated by The American Meter Company.]

Day of Week.	Table No. 1. FOLLOWING THE MOON			Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING.		
	Date.	Light.	Extinguish.		Date.	Complete Lighting in 1 Hour.	Complete Extinguishing in 50 Minutes.
						From Time Given.	
		P.M.				P.M.	A.M.
Thu.	1	7.10	4.30 A.M.	Thu.	1	6.27	3.57
Fri.	2	7.10	4.30	Fri.	2	6.27	3.57
Sat.	3	7.10 N.M.	4.30	Sat.	3	6.17	4.07
Sun.	4	7.00	4.30	Sun.	4	6.17	4.07
Mon.	5	7.00	4.30	Mon.	5	6.17	4.07
Tue.	6	7.00	4.30	Tue.	6	6.17	4.07
Wed.	7	7.00	4.30	Wed.	7	6.12	4.07
Thu.	8	7.50	4.30	Thu.	8	6.12	4.07
Fri.	9	8.20	4.30	Fri.	9	6.12	4.07
Sat.	10	8.50	4.30	Sat.	10	6.02	4.17
Sun.	11	9.30 F.Q.	4.40	Sun.	11	6.02	4.17
Mon.	12	10.10	4.40	Mon.	12	6.02	4.17
Tue.	13	11.10	4.40	Tue.	13	6.02	4.17
		A.M.					
Wed.	14	12.10	4.40	Wed.	14	6.02	4.17
Thu.	15	1.20	4.40	Thu.	15	6.02	4.17
Fri.	16	2.30	4.40	Fri.	16	6.02	4.17
Sat.	17	No L.	No L.	Sat.	17	5.52	4.27
Sun.	18	No L. F.M.	No L.	Sun.	18	5.52	4.27
Mon.	19	No L.	No L.	Mon.	19	5.52	4.27
Tue.	20	6.30 P.M.	8.10 P.M.	Tue.	20	5.52	4.27
Wed.	21	6.30	8.40	Wed.	21	5.47	4.27
Thu.	22	6.30	9.10	Thu.	22	5.47	4.27
Fri.	23	6.30	9.50	Fri.	23	5.47	4.27
Sat.	24	6.30	10.30	Sat.	24	5.37	4.37
Sun.	25	6.20 L.Q.	11.30	Sun.	25	5.37	4.37
Mon.	26	6.20	12.30 A.M.	Mon.	26	5.37	4.37
Tue.	27	6.20	1.40	Tue.	27	5.27	4.37
Wed.	28	6.20	2.40	Wed.	28	5.32	4.37
Thu.	29	6.20	4.50	Thu.	29	5.32	4.37
Fri.	30	6.20	4.50	Fri.	30	5.32	4.37

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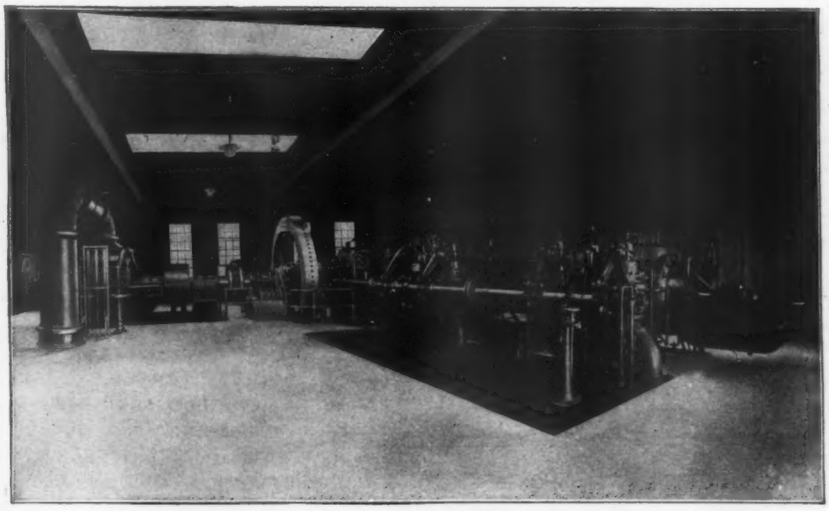
A half century of experience, up-to-date engineering and shop facilities embodied in these **World Famous Gas Exhausters.**



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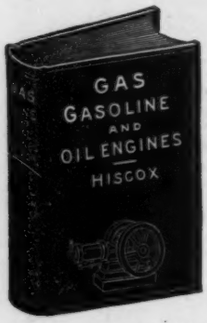

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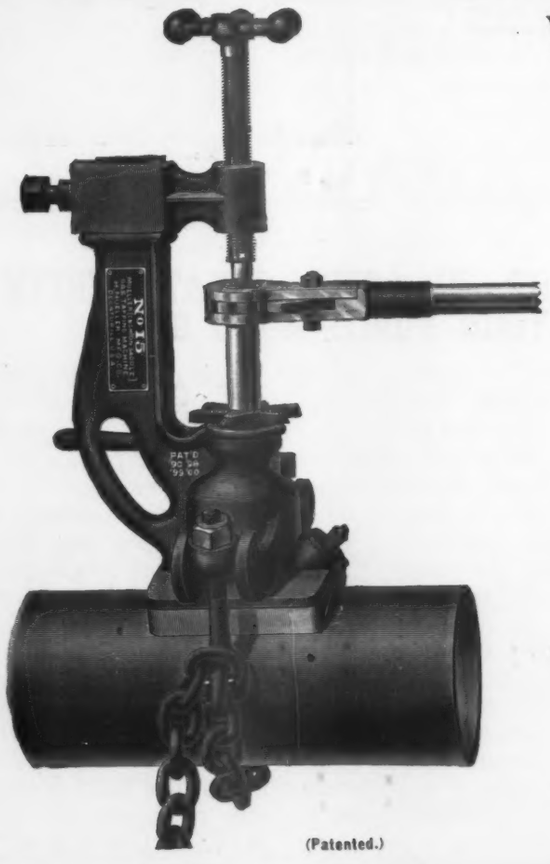

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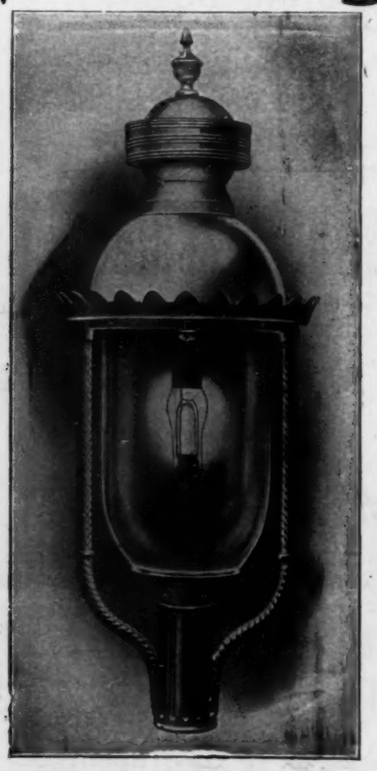

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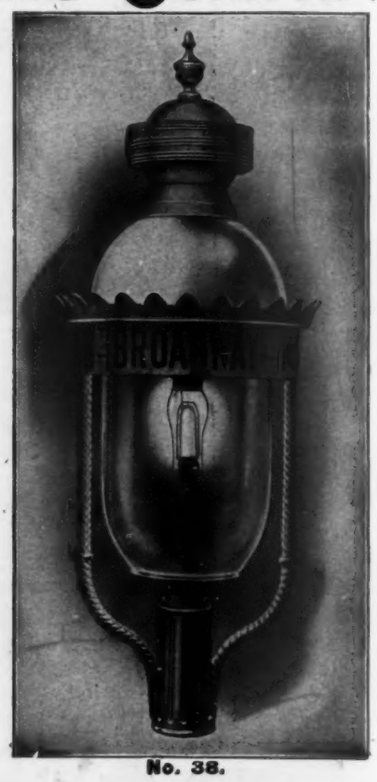

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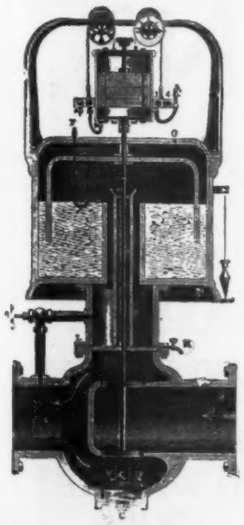

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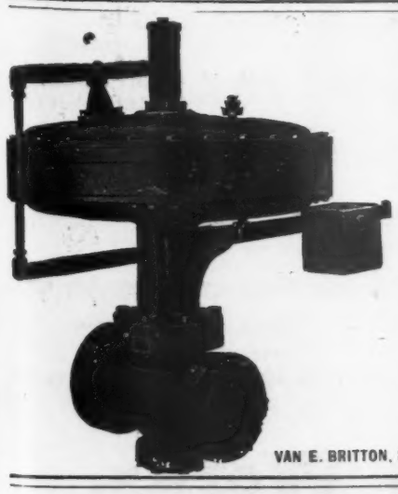

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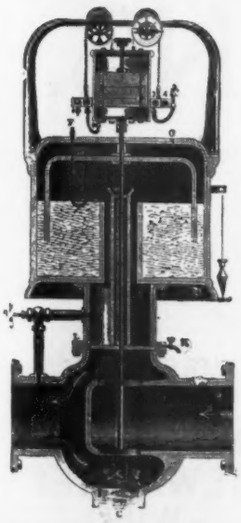

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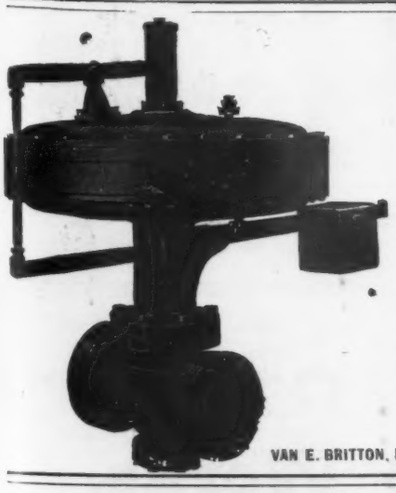

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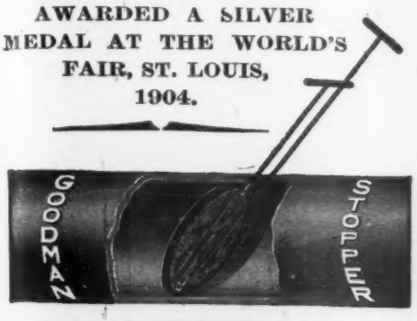

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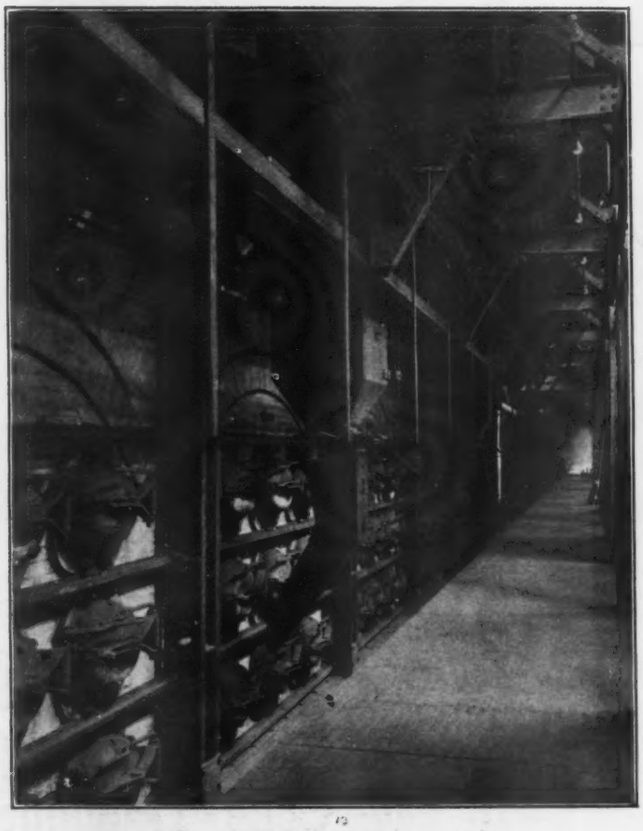

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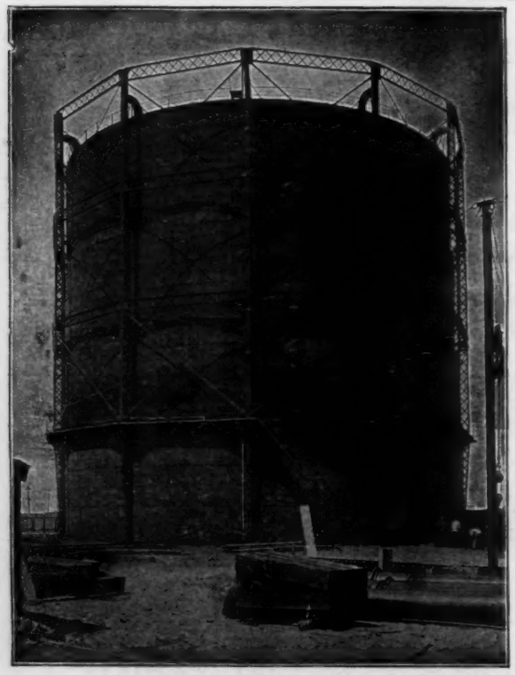

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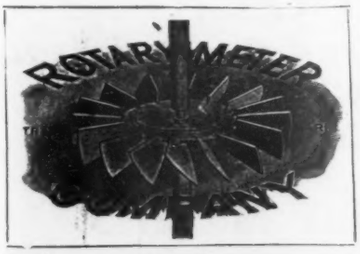

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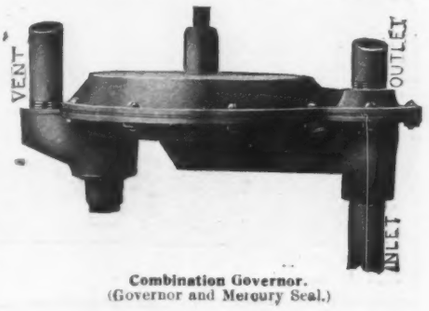

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